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Reporting

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<p>1 IN THE UNITED STATES DISTRICT COURT</p> <p>2 FOR THE DISTRICT OF WYOMING</p> <p>3 Alodie Gooden, as Wrongful Death</p> <p>4 Representative of the Estate of</p> <p>5 Tanya Gooden and Cameron Gooden,</p> <p>6 Plaintiff,</p> <p>7 v.</p> <p>8 Bridgestone Americas Tire Operations, LLC; FedEx</p> <p>9 Ground Package System,</p> <p>10 Inc.; and John Doe</p> <p>11 Corporations/Entities 1-3,</p> <p>12 Defendants.</p> <p>13 *****</p> <p>14 Gina Cubillos, as Wrongful Death</p> <p>15 Representative of the Estate of</p> <p>16 James Ednie,</p> <p>17 Plaintiff,</p> <p>18 v.</p> <p>19 Bridgestone Americas Tire Operations,</p> <p>20 LLC, FedEx Ground Package System,</p> <p>21 Inc.; and John Doe</p> <p>22 Corporations/Entities 1-3,</p> <p>23 Defendants.</p> <p>24</p> <p>25</p> <p>DEPOSITION OF JERRY S. OGDEN, Ph.D., P.E.</p> <p>March 11, 2016</p>	<p>1 PURSUANT TO WRITTEN NOTICE, the deposition of</p> <p>2 JERRY S. OGDEN, Ph.D., P.E., called for examination by</p> <p>3 the Defendant Bridgestone Americas Tire Operations, LLC,</p> <p>4 was taken at the Law Office of Brosseau Bartlett</p> <p>5 Seserman, LLC, 6455 South Yosemite Street, Suite 750,</p> <p>6 Greenwood Village, Colorado, commencing at 9:02 a.m. on</p> <p>7 March 11, 2016, before Claudia R. Booton, a Notary Public</p> <p>8 and Registered Professional Reporter in and for the State</p> <p>9 of Colorado.</p> <p>10 I N D E X</p> <p>11 EXAMINATION PAGE</p> <p>12 By Mr. Brosseau 6, 248</p> <p>13 By Mr. J. Fitzgerald 206</p> <p>14 By Mr. Kline 241</p> <p>15 By Mr. Kapp 255</p> <p>16</p> <p>17 EXHIBITS PAGE</p> <p>18 257 Notice of Deposition Duces Tecum 6</p> <p>19 258 OEC Forensics Communications Report, 7</p> <p>20 11/25/15</p> <p>21 259 Calculations 39</p> <p>22 260 Calculations 39</p> <p>23 261 Handwritten Notes 39</p> <p>24 262 Parameters of ECM Download 39</p> <p>25 263 Photograph, Bates HA 865 62</p> <p>26 264 Photograph, Bates HA 863 87</p>
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18	(Exhibit 300 will be submitted to the original record at a later date by the deponent.)	
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1 PROCEEDINGS

2 JERRY S. OGDEN, Ph.D., P.E.,

3 having been first duly sworn, was examined and testified

4 as follows:

5 EXAMINATION

6 BY MR. BROSSEAU:

7 Q. What is your name?

8 A. It is Jerry S. Ogden, O-g-d-e-n.

9 Q. And you have a Ph.D.?

10 A. Yes.

11 Q. When was that awarded?

12 A. It was awarded in October, and then I

13 walked in December of last year.

14 Q. Okay.

15 A. Actually September. Pardon me.

16 Q. Congratulations.

17 A. Thank you.

18 (Exhibit 257 marked.)

19 Q. Do you recognize what we've marked as 257?

20 A. Yes.

21 Q. What is it?

22 A. That's a notice of deposition for my

23 deposition today.

24 Q. And it has appended to it or has listed on

25 it a list of materials on pages 2 and 3 that are

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1 requested for you to produce; is that right?

2 A. Yes.

3 Q. Have you brought everything?

4 A. I have, in fact.

5 Q. And as I understand it from the brief

6 discussion we had before we began, you have your

7 materials that you produced here today on a combination

8 of electronic media as well as hard copy?

9 A. Correct.

10 Q. And everything is on the table?

11 A. Looks that way, yes.

12 Q. You authored a report in this case,

13 correct?

14 A. Yes.

15 (Exhibit 258 marked.)

16 Q. Does Exhibit 258 appear to be an accurate

17 copy of that, but for the original report included some

18 deposition summaries?

19 A. Without going line by line, it appears to

20 be the same.

21 Q. And you actually have a copy of your

22 report in one of the binders you brought with you?

23 A. I do.

24 Q. Okay. Is Exhibit 258 the only report

25 you've issued in this case?

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1 A. Yes.

2 Q. That report, when it was issued in

3 November of 2014, was your best effort to state the

4 opinions that you hold in this matter?

5 A. Yes.

6 Q. And as far as you're concerned, it was

7 complete?

8 A. Yes.

9 Q. Have you done work since issuing your

10 report that's been marked as Exhibit 258?

11 A. Yes.

12 Q. What have you done?

13 A. I've gone through and derived the

14 equations for the kinematic trail and pneumatic trail.

15 I've gone through and calculated -- well, actually, I did

16 that before -- speeds by gear ratio. And then I've gone

17 through and actually assuming speeds of 78.4 miles per

18 hour and 75 miles per hour what the timing of this

19 incident would be over the distances traveled.

20 Q. And you're talking about from first

21 documented physical evidence of the scene to point of

22 rest of the tractor?

23 A. That's correct.

24 Q. That distance is approximately 597 feet?

25 A. Correct. In addition to that, I've also

Page 9

1 reviewed through John Scott's supplemental report, and I  
2 have some diagrams and some different elements to address  
3 some of the issues where he and I differ.

4 **Q. Have you -- you have not issued any report**  
5 **pertaining to your work there, correct?**

6 A. That's correct.

7 **Q. Why?**

8 A. Because I just received that, and so I did  
9 not have enough time to issue a report.

10 **Q. When did you receive it?**

11 A. I believe I just received that last  
12 Friday.

13 **Q. Has any of the work that you've done or**  
14 **any of the documents you've received changed any of the**  
15 **opinions that you set forth in Exhibit 258?**

16 A. No.

17 **Q. You use the term "pneumatic trail." Is**  
18 **that synonymous, as you use that term, to caster trail?**

19 A. Caster trail is a combination of kinematic  
20 trail and pneumatic trail. So when you look at caster  
21 trail, you set caster on a vehicle. The idea is to set a  
22 positive trail. I can explain if you would like.

23 **Q. Okay. When you said you did equations for**  
24 **pneumatic trail, did you also do them for kinematic**  
25 **trail?**

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1 A. Yes. The equations are actually for --  
2 the derivation is actually for kinematic trail.  
3 Pneumatic trail is based upon contact patch and  
4 distortion of the contact patch, which gives a negative  
5 trail element for the pneumatic portion.

6 **Q. And in order to do that calculation in**  
7 **this case, did you have to determine the caster range?**

8 A. No, because it's all determining the  
9 equations so you can see what the equations of motion  
10 are. You can't determine the caster angle on this  
11 because of the impact.

12 **Q. So the caster angle is not a component of**  
13 **the calculation for kinematic trail or pneumatic trail?**

14 A. It is. That's two different questions. I  
15 did not calculate or determine what it is, but it is part  
16 of it because it goes into the inclination of the  
17 kingpin.

18 **Q. So what you're saying, though, is you were**  
19 **able to determine or calculate a pneumatic trail or**  
20 **kinematic trail without knowing what the caster angle**  
21 **was?**

22 A. I did not say that.

23 **Q. That's why I'm asking you. Were you able**  
24 **to do it without knowing what the caster angle was?**

25 A. I did not calculate it. What I did is

Page 11

1 derive the equation so we can look at the equations of  
2 motion for the vehicle that allows us to be able to  
3 understand how those influence caster.

4 **Q. So what you have done is formed an opinion**  
5 **qualitatively about the effect of the change in caster?**

6 A. Yes. I would agree with that.

7 **Q. But you have not quantified that change?**

8 A. You cannot.

9 **Q. Is it your opinion that the caster angle**  
10 **was changed as a result of the fracture of the steering**  
11 **knuckle spline?**

12 A. No.

13 **Q. Was there any change in the caster angle**  
14 **as a result of the crash of this tractor?**

15 A. Yes.

16 **Q. What caused the change in the caster**  
17 **angle?**

18 A. There is several different stages we have  
19 to look at. The first is when we have disruption of the  
20 pneumatic integrity of the tire, as the tire falls to the  
21 ground, the intercept of the kingpin position or what we  
22 call a kinematic trail versus the location of the center  
23 of contact, theoretically, on the vertical of the center  
24 of the hub increases.

25 When you increase the caster angle, that

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1 produces what we call oversteer. And the whole idea  
2 behind pneumatic trail being back behind is to offset the  
3 kinematic trail so that the caster of the vehicle, as it  
4 drives down the roadway, has positive trail, but not too  
5 positive, so that you're able to have self-aligning  
6 torques that bring the wheels back in the center as the  
7 vehicle moves.

8 **Q. Self-center and steer?**

9 A. That's right. And basically it's a moment  
10 that's created when you have the caster angle intercept  
11 for the kinematic and the pneumatic trail so that you  
12 have the actual caster in front of the tire. When side  
13 forces are placed at the point of the contact on the  
14 roadway, it creates a moment.

15 And if the moment is about the intercept  
16 of the caster on the roadway in front, then that causes  
17 the wheels to self-align back towards the front. If it  
18 ends up being in the back, that actually induces steer to  
19 the tire. So that's why we try to have a positive  
20 caster, kinematic trail and the pneumatic trail.

21 **Q. When you refer to contact, you're talking**  
22 **about contact patch?**

23 A. That's correct.

24 **Q. And when you talk about oversteering, are**  
25 **you talking about that as defined by SAE, vehicle**

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1 **dynamics terminology or in a broader sense?**

2 A. Oh, yes -- no. I mean, in vehicle  
3 dynamics, standpoint oversteer is always oversteer.

4 **Q. I don't know what you mean.**

5 A. Oversteer means that, theoretically, if I  
6 have an oversteer condition in my wheel, either left or  
7 right, if I have my vehicle traveling in a straight  
8 direction and I make a slight right turn, with oversteer,  
9 the vehicle will actually go towards the left. And  
10 that's because the back axles are actually steering the  
11 vehicle in that case rather than the front axles. And so  
12 oversteer is a condition we don't like.

13 NASCAR folks try to get as close to  
14 neutral steer as they can so they have extremely fast  
15 response, but it's very difficult to have stability.  
16 When we have road vehicles, whether they be passenger  
17 vehicles or heavy trucks, we want to have understeer.  
18 That way we have the sensation of the road wheel angle is  
19 different to the heading of the vehicle which is what we  
20 call the slip-or-scrub angle of the vehicle. There's a  
21 difference between those.

22 So as I turn the road wheel, I'll turn the  
23 road wheel at a greater angle than the actual vehicle  
24 moving. That generates lateral forces on the outside of  
25 the edges of the tires which allows that vehicle to move

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1 and it curves back.

2 **Q. When you define oversteer, are you talking**  
3 **about it as a combination -- as the vehicle combination**  
4 **or the tractor only?**

5 A. Well, it will influence the combination,  
6 but we're influencing the tractor only. Where the  
7 tractor goes, the trailers go because they're pinned  
8 together.

9 **Q. And the vehicle dynamics terminology**  
10 **defines steer gradient with reference to the Ackermann**  
11 **steering?**

12 A. That's correct.

13 **Q. Do you know what the Ackermann steer angle**  
14 **is here?**

15 A. I do -- well, no. I can't tell you what  
16 the Ackermann steer angle is because the vehicle has been  
17 destroyed. I can tell you what an Ackermann steer angle  
18 is.

19 **Q. Can you tell us what the Ackermann steer**  
20 **angle was before the crash?**

21 A. I cannot. I don't have any information on  
22 the vehicle.

23 **Q. Do you know what the steer gradient of the**  
24 **tractor was before the crash?**

25 A. I don't. I can't do that without having

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1 the vehicle in its undamaged condition.

2 **Q. Have you looked at any exemplar vehicles**  
3 **in connection with your work in this case?**

4 A. No.

5 **Q. Why?**

6 A. Because it's really not part of my  
7 analysis.

8 **Q. Without looking -- if you did look at an**  
9 **exemplar vehicle, would you be able to determine what the**  
10 **steer gradient was of this vehicle before the crash?**

11 A. I could probably calculate it, yes. If I  
12 know what the sidewall stiffnesses are of the vehicles,  
13 if I know what the slip angles are, I can measure the  
14 slip angles. Then the -- being able to determine what  
15 the steer gradient is is basically an academic  
16 calculation.

17 **Q. And is it correct, then, you don't know**  
18 **what the change in steer gradient was at any time during**  
19 **the accident sequence?**

20 A. That's correct.

21 **Q. How do you know that the vehicle ended up**  
22 **being oversteer?**

23 A. Can I have my photographs? Somebody has  
24 my file that has -- the blue ones.

25 MR. KLINE: Can you read the question

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1 back?

2 (The question was read.)

3 A. Oversteer is a condition where the rear  
4 axles are starting to take over. It's a problem. And  
5 this happens oftentimes in passenger vehicles when, say,  
6 for instance, we have higher tread values in front than  
7 we do in the back, and the back begins to slip. The  
8 front will actually be guiding as the rear is coming  
9 around. It induces a condition we call a yaw.

10 In this particular case, when we look at  
11 the front marks, we can clearly see in the scene  
12 photographs -- very near to the point where we see the  
13 initiation of the front tire marks, we see the rear  
14 wheels of the tractor moving out. We see these dark thin  
15 lines. Those are not braking lines. Those are actually  
16 induced yaw. That means that we're loading the outside  
17 of that tire. And the outside edge of that tire is  
18 leaving a very thin, dark line, because it's actually  
19 weight-shifting to the outside of those axles.

20 The trailer is pushing on it, and then the  
21 trailer follows; and then the trailer in the back will  
22 follow. And we see these lines diverging, and that's due  
23 to oversteer. It means that now the rear end is steering  
24 the front end. Tail is wagging the dog.

25 **Q. (By Mr. Brosseau) So by looking at the**



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1 trailer tire marks, you can tell us that the tractor has  
2 gone oversteer?

3 A. No. I'm looking at the tractor tire  
4 marks. The trailer marks develop later on, but I can see  
5 the driver is on the right side. Those outside tires are  
6 leaving marks.

7 Q. So by the time we see the drive axle tire  
8 marks that you're referring to -- that's what you're  
9 referring to, right, tire marks in the drive axles?

10 A. Yes.

11 Q. By the time we see the drive axle tire  
12 marks, in your opinion, the vehicle has already  
13 transitioned to oversteer?

14 A. The vehicle is -- well, yes. That is a  
15 definition of oversteer. Once the rear wheels start  
16 trying to gain on the front wheels, that puts us into  
17 yaw.

18 Q. Is that something that's recognized in the  
19 vehicle dynamics community, that definition?

20 A. Should be.

21 Q. Is it?

22 A. I don't know. I would imagine so. I  
23 think you could find that in Dean Karnopp's book or  
24 Wong's book or even Mr. Gillespie's book. You could find  
25 it in any of the SAE -- that would tell you that that's

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1 one of those indications.

2 Q. You're aware Dr. Gillespie is a witness in  
3 this case?

4 A. I am.

5 Q. So you would expect Dr. Gillespie would  
6 agree with your assessment that -- or your testimony that  
7 if you see the rear tires tracking like they do here  
8 outside the radius described by the front, that the  
9 vehicle is in oversteer?

10 A. It's an oversteer condition that's  
11 inducing the yaw. I would expect he would agree with  
12 that, yes.

13 Q. Do you recognize Dr. Gillespie as an  
14 expert in vehicle dynamics?

15 MR. KAPP: Object to the form.

16 MR. BROSSEAU: What's the basis?

17 MR. KAPP: I don't have to give you a  
18 basis.

19 MR. BROSSEAU: I have a right to cure my  
20 question if there's a problem with the question. Your  
21 objection is meaningless unless you give me an  
22 opportunity to cure. I'm asking if you wish to give me  
23 an opportunity to cure.

24 MR. J. FITZGERALD: And I just record the  
25 local rules require that.

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1 MR. KAPP: If you're about to seek the  
2 witness' approval or confirmation of your witness, I  
3 think it's an improper line of questioning.

4 Q. (By Mr. Brosseau) You can answer the  
5 question.

6 A. I don't establish expertise for anybody.  
7 That's actually the judge's job.

8 Q. So, for example, when you cited the Wong  
9 book, you're not saying that Wong has expertise in the  
10 area?

11 A. No. I'm saying that Wong is able to give  
12 you -- well, I'm not saying he has expertise -- certainly  
13 he has expertise in the area. It doesn't mean that he's  
14 an expert in expert courses of legal designation. And  
15 since we're all in a legal process, I'm going to have to  
16 leave it there.

17 Q. Does Dr. Gillespie, in your opinion, have  
18 expertise in vehicle dynamics?

19 A. Certainly he does.

20 Q. Do you have expertise in vehicle dynamics?

21 A. Yes, I do.

22 Q. Based on?

23 A. Based on my education, training, and  
24 experience. I have not only education in multilink,  
25 multibody dynamics, planar dynamics, advanced dynamics,

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1 and vehicle dynamics, I also have training through  
2 Society of Automotive Engineers and dynamics that include  
3 vehicle dynamics and heavy vehicle dynamics.

4 Q. Have you ever taken any courses from Dr.  
5 Gillespie?

6 A. I think I did a number of years ago, but  
7 I'm not sure. I took a vehicle dynamics course in -- at  
8 the Ford Fairmont plantation in the mid to late '90s.  
9 I'm not sure that he was one of the instructors or not.  
10 I just don't recall. That might have been about the time  
11 his book came out.

12 Q. Do you have a copy of his report in this  
13 case?

14 A. I do.

15 Q. Do you have any disagreements with it?

16 A. No. I think, in general, he's describing  
17 exactly what would occur in a steady state or in a  
18 condition where we don't have any indication of failure  
19 to the steering components, and he doesn't opine to that.

20 Q. Let me just ask it again broadly. Do you  
21 have any disagreements with anything Dr. Gillespie stated  
22 in his report?

23 A. In general, I don't, under the conditions  
24 that he's cited.

25 Q. And how about specifically?

Page 21

1 A. No.

2 **Q. Would you agree that in the absence of**

3 **confounding environmental driver or other vehicle factors**

4 **of steer axle tire failure, it should be controllable by**

5 **the driver at highway speed?**

6 MR. KAPP: Object to form.

7 A. If you could --

8 **Q. (By Mr. Brosseau) Wait a second.**

9 MR. BROSSEAU: What's the basis?

10 MR. KAPP: You haven't established

11 foundation, and I'm not -- you know what, I'll make my

12 objections. I'm not going to be answering your

13 questions, Mark. Okay? And if for some reason I don't

14 make an adequate objection, the Court will decide that,

15 if and when it comes up. All right?

16 MR. BROSSEAU: Let me just ask this

17 question, Paul. If I ask you to state the basis for your

18 objection, are you going to decline to do so?

19 MR. KAPP: Other than object to the form

20 which the rules require?

21 MR. BROSSEAU: Yeah.

22 MR. KAPP: Yeah, I'm not going to take you

23 through my thought process.

24 MR. BROSSEAU: Okay. Well, I just want

25 the record clear on that. I appreciate it.

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1 A. Could you restate the question?

2 MR. BROSSEAU: Please.

3 (The question was read.)

4 A. I'm not quite sure I understand your

5 question. Maybe you should rephrase it.

6 **Q. (By Mr. Brosseau) Sure. You agree that,**

7 **generally speaking, a steer axle failure on a vehicle**

8 **such as the one involved in this crash -- meaning the**

9 **FedEx vehicle, not the minivans -- doesn't mean that**

10 **everything is lost, correct?**

11 A. That's a statement from my report, All is

12 not lost.

13 **Q. And by that, is it correct that what**

14 **you're saying is that unless you have other things going**

15 **on such as environmental problems, driver factors or**

16 **other vehicle problems, this vehicle should be**

17 **controllable under the circumstances of this accident?**

18 A. And I guess I need to understand what you

19 mean by environmental and driver and other.

20 **Q. Sure. In performing an accident**

21 **reconstruction, before you reach an opinion as to the**

22 **cause or causes of an accident, is it correct that the**

23 **job of the accident reconstructionist is to evaluate the**

24 **contribution to the accident of driver and vehicle and**

25 **environmental factors?**

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1 A. It depends on the case, but, in general,

2 yes.

3 **Q. Okay. And have you attempted to do that**

4 **in this case?**

5 A. Yes and no.

6 **Q. What's the no part?**

7 A. The no part is that part of the

8 environmental is something we cannot address, which is we

9 do not know all the friction values for the vehicle from

10 transitioning it from the westbound lanes to the median

11 to the eastbound lanes. So we can make some general

12 assumptions that may be relatively correct. But we

13 cannot necessarily assess all of those.

14 **Q. If the steering knuckle spline had not**

15 **fractured as you have opined, would the driver of this**

16 **vehicle, in your opinion, have been able to control his**

17 **vehicle?**

18 A. I think it's probable, yes.

19 **Q. And as a general matter, would you agree**

20 **that a tractor-trailer combination such as this one**

21 **operating highway speeds, if there are not vehicle**

22 **problems such as the one you opine occurred here or**

23 **driver factors -- and if you're having a problem with**

24 **that, I can define that.**

25 A. I would like you to.

Page 24

1 **Q. Sure. In evaluating driver factors, as**

2 **you said is frequently done in accident reconstruction,**

3 **is it correct that you're looking at such things as**

4 **driver inputs?**

5 A. Sometimes, yes.

6 **Q. And the driver inputs generally are use of**

7 **accelerator, brakes, or steering, correct?**

8 A. Or combination of those, yes.

9 **Q. But it's going to be one or more of those**

10 **three things when you talk about driver inputs, correct?**

11 A. Typically, yes.

12 **Q. And by environmental, we're usually**

13 **talking about anything external to the vehicle, correct?**

14 A. I accept that, yes.

15 **Q. So, for example, when you talked about**

16 **roadway coefficients or coefficients in the median or in**

17 **the oncoming lanes, those would be environmental factors,**

18 **correct?**

19 A. That's correct.

20 **Q. It would also include such things as other**

21 **traffic, correct?**

22 A. To a certain degree, aerodynamics as well,

23 grade, curvature, so geometric confines certainly.

24 **Q. Super elevation?**

25 A. Geometric confines.

Page 25

1 **Q. Weather?**

2 A. Yes, because weather may, such as wind or  
3 wetness on the roadway from rain or ice, snow, et cetera.

4 **Q. Okay. And so let's go back to driver for**  
5 **a second. When we look at the issue of driver factors,**  
6 **one of the things we're evaluating -- or you're**  
7 **evaluating in a case such as this is what steering was**  
8 **made by the driver, correct?**

9 A. If it's possible, yes.

10 **Q. Was it possible in this case to evaluate**  
11 **anything the driver did in the way of steering?**

12 A. Yes.

13 **Q. And to the extent you were able to do so,**  
14 **did you make that evaluation?**

15 A. Yes, I did.

16 **Q. Did you also attempt to determine whether**  
17 **the driver braked?**

18 A. Yes, I did.

19 **Q. Okay. And were you able to make some**  
20 **determinations regarding that?**

21 A. Yes.

22 **Q. Did you make any determinations about**  
23 **whether the driver applied throttle during the course of**  
24 **the accident sequence?**

25 A. Yes.

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1 **Q. Did the driver apply throttle at any point**  
2 **during the accident scene?**

3 A. There's no evidence.

4 **Q. One way or the other, or that he did?**

5 A. No, meaning from the ECM download, there's  
6 no throttle application.

7 **Q. Is the ECM data reasonably reliable for**  
8 **the purposes of you making that determination?**

9 A. Yes.

10 **Q. As a ballpark figure -- and I recognize**  
11 **that you've testified you've done some calculations,**  
12 **including some since your last report, regarding the**  
13 **amount of time that this accident took. Is it correct**  
14 **that, in general, we're talking about an event that took**  
15 **place between 10 and 11 seconds?**

16 A. There's certain assumptions you have to  
17 make to do that.

18 **Q. Tell me what they are.**

19 A. The assumptions are speed, obviously.  
20 That's our hardest element to deal with. But if we  
21 assume for the sake of the evidence that we currently  
22 have, which includes the GPS data, includes the  
23 statements of the driver, that our speed is somewhere  
24 between 75 and 78.4 miles per hour at the time that we  
25 see the initiation of those tire marks, then the timing

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1 is between 10.38 and 10.85 seconds.

2 **Q. So with those assumptions, we're talking**  
3 **about an event roughly between 10 and 11 seconds?**

4 A. Yes.

5 **Q. And would it be true that the faster that**  
6 **he's going at the inception of those tire marks, the**  
7 **shorter the duration of the accident sequence?**

8 A. That is correct.

9 **Q. Do you have any evidence that the driver**  
10 **was at a speed different from 78.4 miles per hour at the**  
11 **first tire mark?**

12 A. Yes.

13 **Q. What is that evidence?**

14 A. The GPS data.

15 **Q. Anything else?**

16 A. No.

17 **Q. What does the GPS data show you that is --**  
18 **that leads you to a conclusion that his speed is**  
19 **different from 78.4 miles per hour at the first tire**  
20 **mark?**

21 A. Our GPS data shows us two bracketed speeds  
22 that are at or about either side of the tire failure  
23 event. And those speeds are 78.4 and I believe 58 -- let  
24 me check my report because I have it in here. And I want  
25 to be accurate on this. 58.2 miles per hour.

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1 **Q. That's stated at least in part on page 44**  
2 **through 46?**

3 A. Yes. That is my Conclusion 1.

4 **Q. Do you believe that there is as between**  
5 **those two speeds -- first of all, do you believe that**  
6 **there is a reasonable possibility that there is a speed**  
7 **other than one of those two speeds at the first tire**  
8 **mark?**

9 A. You asked me a reasonable possibility.  
10 Those two words do not go together. I think reasonable  
11 probability might be because reasonable and possibility  
12 usually are oxymorons. So what we want to look at is a  
13 reasonable probability, and the answer is it is more  
14 likely than not that it's neither of those speeds, but it  
15 could be either.

16 **Q. Do you have an opinion to a reasonable**  
17 **probability what the driver's speed was at the first**  
18 **documented tire mark?**

19 A. Between 58.2 and 78.4, but I think that we  
20 can narrow that down based upon other evidence that is  
21 subjective, unfortunately. But subjective evidence that  
22 helps us to be able to maybe narrow that down to a range  
23 that makes more sense.

24 **Q. What range makes more sense?**

25 A. I think 75 to 78.4 makes more sense.



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1 **Q. Makes more sense than 58.2?**

2 A. I can explain why.

3 **Q. Please do.**

4 A. At 58.2, you actually have negative times  
5 at the very end, meaning there's not enough time and not  
6 enough friction when everything is happening. So if you  
7 run this through an analysis, speeds below about 65 start  
8 running into a problem on time. And so that means our  
9 speed is most likely closer to that 75 to 78.4 mark.

10 **Q. Let me understand as you're using the term**  
11 **"probability" in this context.**

12 A. Certainly.

13 **Q. Is it, in your opinion, reasonably**

14 **probable that the driver was traveling at a speed of 59**  
15 **miles per hour at the first documented tire mark?**

16 A. No.

17 **Q. Is it reasonably probable that the driver**  
18 **was traveling at a speed of 70 miles an hour at the first**  
19 **documented tire mark?**

20 A. Boy, that's a tough one. It's probable.  
21 That's about all I can say.

22 **Q. If you were asked a question at trial, Dr.**  
23 **Ogden, how fast was Mr. Kehler driving when that first**  
24 **tire mark shows up, what is your answer?**

25 A. Well, 58.2 to 78.4 is our data. However,

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1 I think it's more probable than not out of that range  
2 that he's traveling between 75 and 78.4.

3 **Q. Now, tell me why you believe 75 to 78.4 is**  
4 **more probable.**

5 A. When I start looking at the average  
6 deceleration rate over the entire distance, the 596.5  
7 feet that's being covered during the time that we have  
8 the first disruption of that tire -- the marks with the  
9 gouge and then the cam -- or the caster wobble in those  
10 front axles divergence of the drive and the trailer  
11 that's going off into the median towards the left and  
12 crosses over, that average friction at 75 is a .32. .32  
13 mu is pretty realistic for looking at the fact that we  
14 don't have full braking in the first portion of this  
15 impact; that we are entering the median and sometime  
16 while in the median, braking is occurring to the vehicle.  
17 And then we most likely have near full braking for at  
18 least most, if not all, of the remaining portion of the  
19 travel within the eastbound lanes.

20 At 78.4 that mu becomes a .344 or .34.  
21 That, again, supports that. If we get slower and slower  
22 speeds, that friction becomes less and less and less,  
23 which means that there's essentially no braking at all  
24 during any portion of the event.

25 **Q. When you use the term "braking" in this**

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1 **context, are you talking about application of the service**  
2 **brake?**

3 A. Yes, service brake applications.

4 **Q. When you say mu of .32 or -- you also said**  
5 **.34, you ran a calculation that was -- or you ran some**  
6 **numbers that were presented on an Excel spreadsheet**  
7 **back -- and produced to us back when you did your first**  
8 **disclosure, correct?**

9 A. I think so. I looked at it yesterday or  
10 the day before yesterday, and I have it right here. I  
11 actually went through. It doesn't make a big difference,  
12 but I went through and looked at the rolling radiuses and  
13 made sure that the rolling radiuses were correct for each  
14 of these tires.

15 The values that were in there before were  
16 defaults. It makes a difference of tenths of miles per  
17 hour on each of the gears. But I went through, looked at  
18 my gear ratios and my axle ratios for the transmission,  
19 calculated each of those values as you see, which  
20 provides us that graph that tells us the maximum speeds  
21 capable for this vehicle in each gear governed at 3,000  
22 work hours.

23 **Q. When did you do that analysis?**

24 A. This analysis I did originally. This is  
25 an original analysis that I did. But yesterday or the

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1 day before, I went through and made sure that we didn't  
2 use the default values but we use the actual tire values.

3 **Q. I have not seen that before.**

4 A. It was provided to you.

5 **Q. Can you show me where?**

6 A. Yes. It was in the data. When you  
7 requested it, it was on the thumb drive.

8 **Q. Got it right here.**

9 A. Okay.

10 **Q. Let's plug it in. Do you have yours or do**  
11 **you want to use ours?**

12 A. I don't have a computer.

13 **Q. Okay.**

14 A. It will be under Analysis.

15 **Q. We've got two Analysis documents.**

16 **Dr. Ogden, we just looked at a flash drive**  
17 **that was produced to us back at the time following your**  
18 **initial disclosure. I'll represent that's the only thing**  
19 **that I've received from your file until today and your**  
20 **report that's already been marked as 258.**

21 **You said that you thought also produced**  
22 **were the graphs we just saw?**

23 A. Yeah. The graph is part of that, and I  
24 believe, because you're using Excel 2010, some of the  
25 graphing functions don't correlate between. And that's

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1 been a problem with the Office 365 version which is the  
2 most modern of 2015. You may have lost the graph. But  
3 the graph should have been the very last page.

4 **Q. Are you saying that it is actually on this**  
5 **flash drive?**

6 A. It should be -- it's in that calculation,  
7 because that calculation sheet that you have is a  
8 template that I use. I use it on nearly every single ECM  
9 download. When I crawl under a truck and I count the  
10 teeth on the tow ring and I determine what the axle ratio  
11 is by scraping it off and looking on it and going through  
12 and looking at all of those elements, I'll actually  
13 calculate these.

14 So the graph is part of it. It's just  
15 naturally part of it.

16 **Q. So when we see, like, a 3.42 ratio which**  
17 **is the one for this truck --**

18 A. Yes.

19 **Q. -- you're saying that should be here?**

20 A. Yes.

21 **Q. Okay. And in any event, you produced it**  
22 **back to counsel in November of 2014 with the intent that**  
23 **it be produced as part of your disclosures?**

24 A. Yes.

25 **Q. Is that right?**

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1 A. Yes.

2 **Q. If we were to plug this into another**  
3 **computer, one that you think that isn't limited in its**  
4 **versions, we would be able to see that graph that you're**  
5 **saying is on here?**

6 A. I don't know. I would hope so, because  
7 that's what I provided to you.

8 **Q. You never provided anything to me,**  
9 **correct?**

10 A. Well, I should say that's what I  
11 provided --

12 **Q. To counsel?**

13 A. -- in the analysis data. There's one  
14 other area that we may want to look at. I didn't see  
15 your folders.

16 **Q. Come look at it.**

17 A. Sure. Thank you.

18 What we were just looking at was GPS  
19 analysis and GPS Google Earth. The file that should be  
20 on here should say -- I've got to think of how it's  
21 named. Engine speed, I think is how it's --

22 **Q. Engine speed?**

23 A. Yeah.

24 **Q. And you don't see that folder on there?**

25 A. I don't see it. Well, that could have

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1 been an error when this was produced, but I don't know.  
2 But, basically, what it tells you is, based upon the  
3 configuration of this vehicle with this Eaton Fuller  
4 13-speed transmission, with the ratios for each gear, and  
5 the axle ratio through the axle ratio for this particular  
6 vehicle, up to 3,000 RPMs, it would show you the max  
7 speeds -- actually, it gives you all of the speeds all  
8 the way through the RPM cycle. But it will show you the  
9 maximum speeds.

10 **Q. Does that also have as a component in**  
11 **there the horsepower?**

12 A. No.

13 **Q. Did you run it to 4,000 RPMs?**

14 A. No. This vehicle is governed at 3,000, so  
15 you're not going to reach 4,000. But the way this is  
16 done is also using the rolling radius and the average  
17 revolutions per mile, and this provides you the speeds.  
18 And so the calculation -- I might have it  
19 in here. The calculation is the speed is the RPM in  
20 actually revolutions per second divided by the average  
21 revolutions per mile times the transmission gear ratio  
22 times the axle ratio. And then you just use the RPMs  
23 anywhere from idle speed at 500 up to a maximum of 3,000.  
24 And then this vehicle is actually governed at -- I  
25 believe it was 93 -- just under 94.

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1 **Q. 93.95?**

2 A. I was going to say 93.85 or 93.95, just  
3 under 94. And so you block out those, so you don't graph  
4 those. And that's what provides you with the graph of  
5 the speeds that can be achieved in each of these gears.

6 **Q. When you talked about rolling radius, you**  
7 **need to have a tire that you're using, correct?**

8 A. That's correct.

9 **Q. And the tire that you're using is off of**  
10 **the drive axle?**

11 A. That's correct.

12 **Q. Which tire did you use?**

13 A. Outside tire.

14 **Q. Okay. On Number 1 or Number 2?**

15 A. Both.

16 **Q. Are they the same?**

17 A. Yes -- well, no, they're not. The number  
18 1 -- actually Axle Number 2 is Michelin XDN2s, and the  
19 Number 3 outside is XTA Michelin. And the Number 3 left  
20 outside is a Michelin XDN2. They have slightly different  
21 revolutions per mile. Their loaded radiuses range  
22 between 18.4 and 18.9 inches.

23 **Q. Okay. And I haven't seen your**  
24 **calculations so if you can tell me which tire did you**  
25 **use?**

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1 A. You average them because the average of  
 2 all of those is actually the propulsion of the vehicle  
 3 down the road.  
 4 **Q. Is there any relationship between the**  
 5 **speedometer and the cab and the tire size?**  
 6 A. Yes.  
 7 **Q. What is that relationship?**  
 8 A. It depends on the tire size. If you have  
 9 a larger tire size than what the speedometer is  
 10 calibrated for, the speedometer will read a lower speed  
 11 than the actual ground speed in a straight-line motion.  
 12 If the tire size, meaning the rolling radius, is smaller  
 13 than the tire size at which the speedometer is calibrated  
 14 for, then the speedometer will read a higher speed than  
 15 the over-the-road straight line speed of the vehicle.  
 16 **Q. Given the tires that were on the drive**  
 17 **axles were out of position on this vehicle, was the**  
 18 **driver in the cab getting a true reading from the**  
 19 **speedometer?**  
 20 A. No.  
 21 **Q. Which direction was it occurring?**  
 22 A. It was erring on the low side, meaning the  
 23 vehicle's over-the-road speed is slightly higher than  
 24 what he would see on the speedometer.  
 25 **Q. How does that relate to cruise control on**

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1 **this vehicle?**  
 2 A. Cruise control obviously is based upon the  
 3 speedometer speed that you're setting. That's how you're  
 4 viewing it. So when I'm setting my cruise control at 75  
 5 miles per hour, my speed will be slightly greater. I can  
 6 calculate -- I didn't calculate that, but that can be  
 7 calculated.  
 8 **Q. Is it in the range of about 1 percent**  
 9 **greater in this case?**  
 10 A. I can't say. I would calculate it. But I  
 11 would imagine that it's probably a little bit higher but  
 12 maybe not much. The difference between these tires and  
 13 the ones that the vehicle is rated for is actually only a  
 14 difference in sidewall height of about 3 millimeters.  
 15 **Q. So just so we're clear and the record's**  
 16 **clear, in the event the driver testified, for example,**  
 17 **that he set his cruise control -- and this is a**  
 18 **hypothetical -- at 78 miles an hour, in fact, that**  
 19 **vehicle would be going slightly faster than 78?**  
 20 A. Sure, that's correct.  
 21 **Q. Can I get a copy of those pages that you**  
 22 **were referring to that you said you thought would have**  
 23 **been produced to us with this flash drive?**  
 24 A. You know, if you would like, I can -- if  
 25 you want a copy of everything in Tab E, which is my

Page 39

1 analysis --  
 2 **Q. Sure.**  
 3 A. It's right here. That also has all my --  
 4 talking about the kinematic trail, pneumatic trail, which  
 5 adjusts for your caster. This is the analysis for that.  
 6 This also gives you the analysis of the effects of your  
 7 road wheel direction and slip and how that affects  
 8 oversteer and understeer, calculate from -- here is your  
 9 Ackermann angle and going through all that, no problem.  
 10 **Q. Okay. Thank you.**  
 11 A. I derive this for a left turn. It's  
 12 usually derived for a right turn for SAE coordinates. I  
 13 just switched coordinates so it made it easier.  
 14 **Q. Are you talking about for J-266 purposes?**  
 15 A. Yeah, because usually you report points  
 16 down on that vehicle. In this case, I still had positive  
 17 numbers. I just switched my coordinates for a left turn.  
 18 **Q. But you are saying, if you want J-266, it**  
 19 **will run to the right?**  
 20 A. You would be going to the right, that's  
 21 correct.  
 22 MR. BROSSEAU: Why don't we take a couple  
 23 of minutes.  
 24 THE DEPONENT: Sure.  
 25 (Recess from 9:50 a.m. to 10:01 a.m.)

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1 (Exhibits 259 through 262 marked.)  
 2 **Q. (By Mr. Brosseau) Dr. Ogden, you've**  
 3 **provided us with your -- a portion of your file from your**  
 4 **work product.**  
 5 **What would you characterize that Section E**  
 6 **as being?**  
 7 A. Section E in my section of my notebook is  
 8 called Calculations.  
 9 **Q. And we copied those and broke them into,**  
 10 **as you've suggested, three different collections, in**  
 11 **essence?**  
 12 A. Yes.  
 13 **Q. And one of those is marked as 259. A**  
 14 **second is 260, and a third is 261.**  
 15 A. That's correct.  
 16 MR. KAPP: And, Mark, is it your intention  
 17 to ultimately make his file an exhibit or just portions  
 18 of it?  
 19 MR. BROSSEAU: Probably portions.  
 20 MR. KAPP: Okay.  
 21 MR. BROSSEAU: I'm trying to save a tree  
 22 or two.  
 23 MR. KAPP: I'm going to just throw it in  
 24 at the end anyway.  
 25 MR. BROSSEAU: I'll leave that to you.

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1 You already assured me you weren't going to ask any  
2 questions, so we'll have to do it as --

3 MR. KAPP: That won't be a question. That  
4 will be a statement.

5 **Q. (By Mr. Brosseau) I also had the reporter**  
6 **mark while we were off one other document that I think**  
7 **you're familiar with, 262.**

8 **Are you familiar with that?**

9 A. Yes. This looks like it's off of the  
10 parameters portion of the ECM download.

11 **Q. And that ECM download is one that was**  
12 **either done by Martonovich or by Martonovich in**  
13 **combination with somebody from Fay Engineering, correct?**

14 A. Martonovich didn't do one for us. I did  
15 it.

16 **Q. Oh, okay.**

17 A. I did the download. So this is either  
18 mine or the one that was done by Fay Engineering. They  
19 will be the same.

20 **Q. Do you recognize this as being from the**  
21 **subject tractor?**

22 A. I do.

23 **Q. I'm curious -- and to give you the**  
24 **context, it's in reference to RPM.**

25 A. Yes.

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1 **Q. I see two RPM -- references under common**  
2 **limiters towards the top.**

3 A. Yeah.

4 **Q. One at 3,000 RPM and one at 4,000 RPM.**  
5 **And then in the section under PGR 005, I see references**  
6 **to 4,000 RPM.**

7 A. Yes.

8 **Q. And you said that this engine is limited**  
9 **to 3,000 RPM.**

10 **How do you know that?**

11 A. It's limited -- engine speed is limited  
12 vehicle stop, 3,000. Max engine speed is 4,000. I just  
13 misstated that.

14 **Q. So the max engine speed is what for --**

15 A. 4,000.

16 **Q. So why did you calculate it using a max of**  
17 **3,000?**

18 A. Because, basically. That's all I can tell  
19 you. I mean, I can do it at 4,000, but 3,000 is -- 4,000  
20 is redlining the vehicle. So I think -- I can certainly  
21 do it at 4,000. But I just misread this and went to  
22 3,000. It's not going to make a big difference in the  
23 curve. You just continue those up because they're  
24 straight line curves.

25 **Q. The exercise that you use the 3,000 RPM**

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1 **was to determine, among other things, what the maximum**  
2 **speed this vehicle could do, correct?**

3 A. No. It's maximum speed in each gear. So  
4 if we look at -- let me show you here. We know what the  
5 maximum speed of the vehicle can do.

6 **Q. What is that?**

7 A. That's 93.95 miles per hour governed  
8 speed. So anything that we can calculate that's higher  
9 would be irrelevant anyway. So if you continue these  
10 down, you'll see that none of that would matter.

11 So at 3,000 RPMs, in fact, max speed in  
12 13th gear occurs at about -- between 2,100 and -- let me  
13 turn this right here -- between 2,000 and 2,100 RPMs. So  
14 4,000 RPMs doesn't give you any more speed.

15 **Q. Let me back up and get more basic. What**  
16 **was the reason for attempting to determine the max speed**  
17 **of the vehicle in different gears?**

18 A. Every time I do a download, this is the  
19 process.

20 **Q. For what purpose?**

21 A. Just so I know the behavior of the  
22 transmission.

23 **Q. Did this lead to any of your conclusions?**

24 A. Not at all. It's just a step I naturally  
25 do.

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1 **Q. So the work that you did, at least**  
2 **reflected in this work, is not pertinent to the opinions**  
3 **you've formed in this case?**

4 A. That's correct.

5 **Q. It is your opinion that this vehicle was**  
6 **capable of being driven on the day of this accident at**  
7 **93.95 miles per hour?**

8 A. It can achieve that, yes, if the  
9 conditions are correct.

10 **Q. Is there anything about the conditions**  
11 **that were incorrect for allowing it to achieve 93.95**  
12 **miles per hour at the time of this accident?**

13 A. May not be able to do it on a flat road.  
14 It may be able to do it on a downward incline road. Load  
15 is the issue in the vehicle.

16 **Q. Do you know what the load was in this**  
17 **vehicle?**

18 A. I do not.

19 **Q. Have you made any attempt to determine it?**

20 A. No. It's not really important for my  
21 analysis.

22 **Q. Okay. So at this point, you don't know**  
23 **whether it actually could do 93.95 at the time of the**  
24 **accident. It may have been able to. Is that right?**

25 A. That's correct.



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1 **Q. And if you wanted to determine whether**  
2 **load would impede its ability to do 93.95, you would have**  
3 **to do additional work which you have not done yet?**  
4 A. And I'm not going to do, that's correct.  
5 **Q. Have you done all the work that you've**  
6 **been asked to do?**  
7 A. And more, yes.  
8 **Q. So you've done more work than you've been**  
9 **asked to do?**  
10 A. Certainly.  
11 **Q. What were you asked to do?**  
12 A. I was asked to initially document the  
13 scene and the vehicles, and that was it. And we  
14 responded within about 16 hours of -- 16 to 18 hours of  
15 the incident. I was actually at the scene by eight  
16 o'clock in the morning the next day documenting the  
17 scene. The Chevrolet was actually still on scene but was  
18 pulled off to the side when we arrived. And a tow truck  
19 was strapping it in to take it off and take it to the tow  
20 yard. That was the initial thing I was asked to do.  
21 And so we went through and we documented  
22 that information. Much later on we were asked to -- of  
23 course, we were asked to download the vehicle.  
24 **Q. The vehicle in this case being the**  
25 **tractor?**

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1 A. That's correct. And then as a part of the  
2 process, we inspect -- we also went through and looked at  
3 the braking system that we could, because part of it is  
4 destroyed, and you can't measure what's destroyed. That  
5 wasn't a specific request but that's something I normally  
6 do.  
7 And we obtained -- we noticed that there  
8 was a Garmin GPS in the vehicle. We called the client --  
9 it was Amanda Good at that time -- and requested  
10 permission to keep that Garmin so that we could later  
11 download it if necessary to determine if there was any  
12 GPS data which obviously we have.  
13 **Q. Which obviously what?**  
14 A. We have now.  
15 **Q. Thank you. So you were giving us a**  
16 **chronology of your activities as it related to the scope**  
17 **of your assignment?**  
18 A. Yes.  
19 **Q. Could you continue, please.**  
20 A. Later on the case was transferred to Lloyd  
21 Smith at Murane & Bostwick. And Lloyd asked us to do  
22 some analysis. But also we were asked to do some  
23 additional tasks. One was the observation of inspections  
24 of the freightliner that were conducted by various other  
25 individuals, removal of the right front steer tire as

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1 well as the left front steer tire so that those could be  
2 put into evidence and analyzed by other folks.  
3 Additional download of the ECM unit for  
4 the freightliner, and that included removal of the three  
5 components. Actually I think only two components were  
6 removed so that they could be bench downloaded, if I  
7 recall right. Mat did those. And then the analysis to  
8 determine, if I could, what my opinion was as to how this  
9 event occurred, and so that's what precipitated the  
10 report.  
11 **Q. I noticed within your report, Exhibit 258,**  
12 **that there were several pages that addressed the two vans**  
13 **that were part of this crash.**  
14 A. Yes.  
15 **Q. It looked like at one point you were**  
16 **looking at an issue related to nondeployment of the Dodge**  
17 **front airbags.**  
18 A. Yes.  
19 **Q. Have you formed any opinions regarding the**  
20 **reason or reasons that those bags did not deploy in this**  
21 **case?**  
22 A. I can tell you reasons that are not  
23 associated, but I can't tell you reasons why they didn't.  
24 Does that make sense?  
25 **Q. If you can tell me what those reasons are,**

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1 **it might make more sense.**  
2 A. Certainly. The airbag control module in  
3 the Dodge has capacitors, and those capacitors --  
4 actually, it's the roll sensor, but the capacitors store  
5 energy --  
6 **Q. I'm sorry. Did you say roll?**  
7 A. Roll sensor, yeah. The capacitors store  
8 energy. And the purpose of those capacitors to store  
9 energy is that in the loss of energy, there's still  
10 enough to be able to send a command and deploy the  
11 airbags.  
12 In this particular case, signals --  
13 command signals were actually generated from the control  
14 module to fire these airbags. That included the knee  
15 bolsters, the fronts, but they did not deploy.  
16 Even with power interruption during the  
17 impact, there should have been energy from these  
18 capacitors to deploy those airbags. I can see that this  
19 vehicle has been modified and modification of that  
20 vehicle and putting additional components inside for the  
21 handicap accessibility and operation of that vehicle  
22 could potentially have disrupted some of that  
23 communication.  
24 And if that's the case, then you have an  
25 issue with those airbags that are going off that are an



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1 issue by those individuals that had done those  
2 modifications.  
3 The other potential is that this vehicle  
4 could potentially also have been -- had a problem from  
5 the factory, meaning that as it leaves Chrysler's plant,  
6 there's an issue with the communication between the ACM  
7 and the ability to deploy these airbags. But we don't  
8 have that information, and that's really beyond the scope  
9 of what I'm here to do, because I'm not here to look at  
10 that particular reason.

11 But that is a reason that I think is  
12 important to be looked at. And the deployment of the  
13 airbags could have been very important for the front seat  
14 occupants of the vehicle.

15 **Q. Whether, in fact, they were important**  
16 **would require a biomechanical analysis; is that true?**

17 A. Well, yes and no. It's going to require  
18 additional analysis to determine why they didn't deploy.  
19 And then obviously kinematic analysis, which is an  
20 engineering analysis, to determine how the motion is  
21 going to be affected during the deployment of the event.

22 Biomechanically or biomedically, you can  
23 look at the attenuation that's provided from the airbag  
24 system. And you're going to have to look specifically at  
25 the driver and the passenger because they have two

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1 different experiences in this impact. The outcome may be  
2 very different for both of them.

3 **Q. When you say "kinematic analysis" in this**  
4 **context, you're talking about an analysis of the**  
5 **occupants' kinematics; is that right?**

6 A. That's correct. Kinematics means the  
7 geometry direction. It just means the direction in which  
8 that motion is occurring. It has nothing to do with the  
9 forces that are applied. It's really a Newton's first  
10 law application of inertia.

11 **Q. In terms of whether a nondeployment of the**  
12 **airbags had any relationship to any of the injuries**  
13 **sustained by either of the front seat occupants, that**  
14 **issue -- the injury mechanism, injury causation, injury**  
15 **potentiation is not within your fields of expertise; is**  
16 **that right?**

17 A. I do not opine to those areas, that's  
18 correct.

19 **Q. Were you present when the right front**  
20 **wheel and tire -- steer axle, right front steer axle of**  
21 **the tire was taken off of the tractor?**

22 A. No.

23 **Q. You testified, if I wrote it down**  
24 **correctly, that that was something that was done later?**

25 A. That's correct.

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1 **Q. Was that after Lloyd came in?**

2 A. I don't recall at this point.

3 **Q. You have video of that demount?**

4 A. That's correct.

5 **Q. Where was that demount done?**

6 A. I don't recall at this point.

7 **Q. Do you know if it was at an Elway**  
8 **dealership?**

9 A. I don't recall.

10 **Q. Did OEC have possession of the right front**  
11 **wheel and tire at some point?**

12 A. I don't think so. I think the tire was  
13 removed and was shipped, but I don't recall,  
14 specifically. I don't recall ever having possession of  
15 it. I would have known, but I think it was removed and  
16 shipped. And I think we scheduled for that shipping, but  
17 I do so many different cases like this that I can't  
18 recall which one was which, so --

19 **Q. But when you say shipped, you mean shipped**  
20 **from the facility that removed that wheel and tire?**

21 A. Yes. And I believe it was shipped to  
22 someone to look at, but I --

23 **Q. Do you know if that someone was Bill**  
24 **Woehrle?**

25 A. I don't know whether it was Bill Woehrle

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1 or whether it was Bridgestone or who it was.

2 **Q. While we're on that topic of Woehrle, do**  
3 **you know Bill Woehrle?**

4 A. Generally.

5 **Q. Have you ever worked with him on a matter**  
6 **that you've investigated?**

7 A. I've been on both sides working with Bill.

8 **Q. Do you recognize him as a person having**  
9 **expertise in tire design and manufacture?**

10 A. Yes.

11 **Q. Do you recognize him as somebody that has**  
12 **expertise in tire failure mode analysis?**

13 A. Yes.

14 **Q. Are you offering any opinions as to what**  
15 **caused this tire to fail?**

16 A. I am not.

17 **Q. Are you offering any opinions in this case**  
18 **with respect to the design or manufacture of this tire?**

19 A. No.

20 **Q. Or of the materials used in the**  
21 **manufacture of the tire?**

22 A. No.

23 **Q. Other than how this tire performed on this**  
24 **vehicle, are you offering any opinions related to the**  
25 **subject tire?**

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1 A. Only those contained within my report,  
2 that's it.

3 Q. Fair enough. We've talked about your  
4 familiarity, a little bit at least, with Dr. Gillespie  
5 and with Mr. Woehrl.

6 A. Uh-huh.

7 Q. You have -- in the past you've actually  
8 been a co-worker with John Scott?

9 A. Well, actually, he worked for me. I was  
10 his supervisor for a while.

11 Q. At Alcorn?

12 A. Yes.

13 Q. And you've also had occasion since that  
14 time at Alcorn to be in cases in which John has also been  
15 involved, correct?

16 A. Sorry. I don't understand your question.

17 Q. John at some point left Alcorn, correct?

18 A. Yeah. So did I.

19 Q. And since those days at Alcorn, the two of  
20 you, on occasion, have worked on the same matter?

21 A. We have, both on the same side and on  
22 opposite sides.

23 Q. Okay. Have you ever done any work in a  
24 matter with Lew Grill?

25 A. I've only seen Lew on the opposite side.

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1 Q. And you're familiar, then, with him, at  
2 least to some extent, from litigation matters in which  
3 you've been involved?

4 A. Yes.

5 Q. Do you have any relationship with  
6 Mr. Grill other than through your work on litigation  
7 matters?

8 A. None.

9 Q. Have you ever come across Pete Philbrick?

10 A. Yes.

11 Q. In connection with litigation matters?

12 A. Yes.

13 Q. Anything other than litigation matters?

14 A. No.

15 Q. Same question regarding Joe Grant; do you  
16 know Joe Grant?

17 A. No, other than this matter.

18 Q. Do you know Brian Queiser?

19 A. No, other than this matter.

20 Q. Do you know Dennis Ritchie?

21 A. I don't know. That name is familiar, but  
22 I don't know him.

23 Q. Is it true that you are not addressing any  
24 issues as to the propriety or the reasonableness of the  
25 conduct of CLR Transportation?

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1 A. Correct.

2 Q. Is it correct you're not offering any  
3 opinions as to the reasonableness or the propriety of the  
4 conduct of FedEx Ground?

5 A. Correct.

6 Q. Is it correct that you're not offering any  
7 opinions as to the propriety and reasonableness of the  
8 conduct of Steven Marks?

9 A. Correct.

10 Q. What areas, if any, of the conduct of  
11 Brian Kehler are you addressing in this case?

12 A. My opinion is that he has no control of  
13 the vehicle once the disruption of the steering  
14 mechanisms occurs and, therefore, there's nothing that he  
15 can do. That's my comment.

16 Q. Anything else that you're addressing  
17 regarding the conduct of Mr. Kehler?

18 A. Yes.

19 Q. What else?

20 A. Braking has not actually occurred until  
21 he's in the median and the vehicle is already off the  
22 roadway, the travel portion of the westbound lanes of the  
23 roadway.

24 Q. Anything else about the conduct of  
25 Mr. Kehler that you're addressing?

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1 A. No.

2 Q. Is there physical evidence of applications  
3 of the service brake by Mr. Kehler in the median?

4 A. Yes.

5 Q. Is there application -- is there evidence  
6 of application of service brake by Mr. Kehler in the  
7 eastbound lanes?

8 A. In the eastbound lanes, yes, I believe  
9 there is.

10 Q. We were talking earlier before I  
11 distracted myself about documents in Section E of your  
12 binder --

13 A. Yes.

14 Q. -- copies of which we made Exhibits 259,  
15 260, and 261.

16 A. Yes.

17 Q. We also talked about those in reference to  
18 a flash drive which have been provided to us. And my  
19 understanding -- you tell me if this is correct -- is you  
20 believe that those materials probably should be with the  
21 collection that was on the flash drive that we plugged in  
22 and showed you earlier; is that right?

23 A. Yes. And I also believe that could very  
24 well have been error on the part of what we see when that  
25 was put in. I don't know -- and I apologize. There's no

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1 way for me to know that.

2 Q. I'm not looking to attribute fault to it.

3 I'm trying to find out where materials are or were and

4 make sure that I didn't miss something that was produced.

5 A. Sure.

6 Q. One of the things that I noted on that

7 flash drive that I did not see in Exhibit E, and I think

8 you saw it also when you looked at my associate's screen,

9 is that there was an Excel spreadsheet that had some

10 calculations on it that related, at least in part, to

11 speed.

12 A. GPS, correct.

13 Q. And that also had columns which reported

14 numbers for longitudinal deceleration, correct?

15 A. Longitudinal deceleration?

16 Q. Yeah.

17 A. Well, longitude and latitude are provided

18 in the speed numbers. There could very well be, but I

19 don't have the sheet in front of me.

20 Q. Let me put it this way, you told me -- you

21 testified earlier that if you used a speed at the

22 initiation -- so we're clear -- in fact, let's clear that

23 up now and make sure we stay on that so we can use the

24 same terminology.

25 When you talk about a distance of 597

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1 feet, we're talking about two final rests from a point,

2 correct?

3 A. Correct.

4 Q. And the point that you're using for that

5 measurement is the first documented physical evidence in

6 the westbound lanes?

7 A. That's correct.

8 Q. And that physical evidence is a tire mark;

9 is that correct?

10 A. That's correct.

11 Q. And that mark was identified by the

12 Wyoming Highway Patrol on the day of the accident,

13 correct?

14 A. Yes.

15 Q. And, in fact, it was marked with orange

16 paint?

17 A. That's correct.

18 Q. And when you went out the next morning,

19 you found that same mark, correct?

20 A. Yes.

21 Q. And you photographed -- you took lots of

22 photographs of it?

23 A. I did.

24 Q. Did you find that when you were out there

25 that orange paint was still there?

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1 A. Yes.

2 Q. Did you look to see whether that tire mark

3 extended farther to the east --

4 A. Yes.

5 Q. -- than where the Wyoming Highway Patrol

6 painted it?

7 A. Yes.

8 Q. And did you find any evidence that it did?

9 A. No.

10 Q. You would agree that tire marks over

11 time -- when I say "over time," I'm including within the

12 roughly 16 hours between the time of the crash and the

13 time you were out there -- do have a tendency to

14 dissipate somewhat, correct?

15 A. In 16 hours, highly unlikely. If we're

16 talking 16 days, probably.

17 Q. Do you understand that traffic passed over

18 that section where the tire mark was after the accident

19 and before you were there?

20 A. Yes.

21 Q. Would you agree, then, that the distance

22 from the first documented tire mark identified by the

23 Wyoming Highway Patrol to point of rest was at least the

24 farthest east mark left by a tire from this vehicle?

25 A. Yes.

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1 Q. It may have been farther east, but you

2 don't find any physical evidence of that, correct?

3 A. Yes, that's correct.

4 Q. Is it fair to call that the first

5 documented physical evidence?

6 A. Certainly.

7 Q. That's an appropriate way to refer to it

8 in talking about accident reconstruction?

9 A. Certainly.

10 Q. So if we talk about the first mark and if

11 we try to use that as shorthand, can we agree we're

12 referring to that point, 587 feet, for final rest and as

13 the mark identified by you and the Wyoming Highway Patrol

14 as the first physical evidence in the westbound lane at

15 this crash?

16 A. Yes.

17 Q. Thank you. So if we look, then, at that

18 first mark, what produced that first mark?

19 A. The left front tire, right front tire, and

20 the rim on the left front tire.

21 Q. Do you find a rim mark at the beginning of

22 that mark?

23 A. Yes.

24 Q. Do you have a photograph that you can show

25 me that shows that rim mark?

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1 A. Yes.

2 Q. You're handing me a collection of

3 photographs, at least some of which have a Hirst

4 Applegate, HA, Bates number, correct?

5 A. Yes. The one specifically is on the top.

6 And if you'd like, I can take that one off, if you would

7 like.

8 Q. Certainly. And if you wouldn't mind, if

9 we could -- you can take that off and circle for me the

10 rim gouge or the rim mark --

11 A. Yes.

12 Q. -- and we can mark it.

13 A. Could we make copies of these so mine are

14 not -- because these are my originals that I have.

15 Q. Sure. Let's do so.

16 MR. KAPP: Off the record.

17 (Recess from 10:29 a.m. to 10:44 a.m.)

18 Q. (By Mr. Brosseau) You gave us copies of

19 some of your file material. I think -- are these all

20 prints of photos?

21 A. They are. Do you want me to read those

22 for the record?

23 Q. Actually, let's take them -- they're in a

24 group for a reason; is that right?

25 A. Just because they're scene photos.

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1 Q. Okay. Let's go ahead and -- we might as

2 well mark them as a group.

3 A. Okay. If you would like, once we have

4 them marked as a group, we can go A, B, C, D or whatever.

5 Q. Absolutely. Sounds great. You've done

6 this before.

7 A. Not my first rodeo.

8 (Exhibit 263 marked.)

9 Q. Exhibit 263 is a set of prints matching

10 the prints that you brought with us and handed to me just

11 before we took the break.

12 A. That's correct.

13 Q. And they are all scene photos?

14 A. Yes.

15 Q. Are they all scene photos taken by OEC?

16 A. No. These are all -- most of these should

17 be scene photos taken by Wyoming Highway Patrol.

18 Q. Okay. You pointed me, at the beginning,

19 to a print that you said would show a rim gouge from the

20 left steer axle tire, correct?

21 A. That's right.

22 Q. Are we looking at that photo now?

23 A. Yes.

24 Q. Could you please circle or indicate in

25 some fashion the rim gouge that you're referring to?

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1 A. (Deponent complied.)

2 Q. Okay. And you've drawn two ovals in kind

3 of dashed fashion on roughly the center of the first

4 page, 263?

5 A. That's correct.

6 Q. Does that represent both the outboard and

7 inboard wheel flange?

8 A. Yes.

9 Q. What lane are we looking at that has those

10 two circles?

11 A. This is the outside or right westbound

12 traffic lane of I-80.

13 Q. Sometimes also called Number 2?

14 A. I don't number them that way. That's very

15 confusing.

16 Q. Okay. And that foreground where you've

17 drawn the circles, is the right lane the lane towards the

18 top where the yellow fog line is the left lane?

19 A. Inside lane, yes.

20 Q. Do those rim gouges continue along the

21 path of that tire?

22 A. Yes. They are intermittent. As the tire

23 builds up mass underneath the rim -- with the rim off,

24 and then every once in a while you will see rim gouges

25 irregularly, but they will be positioned along that

Page 64

1 distance.

2 Q. How do you know that that's the rim rather

3 than the tire sidewall?

4 A. That's the gouge, so the tire sidewall is

5 not going to gouge the roadway.

6 Q. And what causes the intermittency of the

7 gouging from the left steer axle wheel?

8 A. I believe I just described that. It's the

9 mass of the tire. The tire is not moving in conjunction

10 with the wheel. So the intermittency is that oftentimes,

11 what's happening is the rim is rolling up onto the tire

12 or a portion of the tire and lifted off of the roadway

13 surface. It could be for a distance and then drops back

14 down.

15 Q. Is the tire -- is this the very first

16 evidence -- the first point we've talked about, the first

17 mark?

18 A. Yes.

19 Q. Okay. And by this, we're talking about

20 what you've just circled -- the two circles you've placed

21 on Exhibit 263?

22 A. Yes, and that is marked as HA 000865.

23 Q. Is the tire deflated by that time?

24 A. That's the nature of the rim gouges, yes,

25 so it is debaded and deflated.

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1 **Q. And, in fact, in your opinion, it must be**  
 2 **deflated given the path and orientation of this tractor**  
 3 **in order to produce those rim marks if those do come from**  
 4 **the left steer axle?**

5 A. That's correct.

6 **Q. Did this tire experience a tread**  
 7 **separation during the course of this accident?**

8 A. Yes.

9 **Q. Did it occur before or after the**  
 10 **deflation?**

11 A. I don't know. I would -- I don't see any  
 12 evidence of any kind of rubber marks that are typical of  
 13 a still inflated yet tread separated tire which usually  
 14 leaves marks on the roadway in rubber -- dark rubber  
 15 marks that are leading up to the point where complete  
 16 separation of the tread from the carcass occurs. I don't  
 17 see that, so my opinion from looking at that, it's  
 18 unlikely, but it could have occurred for a very short  
 19 distance, a very short period of time just before  
 20 deflation.

21 **Q. I caught most of your answer, I think, but**  
 22 **what I'm missing is, do you have an opinion as to whether**  
 23 **a tread separation preceded the deflation?**

24 A. I don't know. That's what I was  
 25 indicating.

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1 **Q. Do you see any evidence on the surface of**  
 2 **the westbound lanes of a tread separation initiating or**  
 3 **occurring?**

4 A. Potentially, yes.

5 **Q. Is there anything you can point to and say**  
 6 **to a probability that is such evidence?**

7 A. Probably not.

8 **Q. Probably not?**

9 A. Yeah, probably not. We can clearly  
 10 see -- do you want me to explain?

11 **Q. Please.**

12 A. Okay. We can clearly see that deflation  
 13 of the tire and disruption of the tire's integrity occurs  
 14 at this point. I mean, we can see that occurring because  
 15 where the gouges are is also the initiation of our tire  
 16 marks. And the tire marks are very irregular on the left  
 17 front, meaning that the edges are leaving marks at  
 18 irregular intervals but are also due to the imbalanced  
 19 caster moving back and forth because the tire's both  
 20 steer axle tires are seeking equilibrium throughout this  
 21 event.

22 **Q. Would you agree that the appearance, the**  
 23 **characteristics as photographed and as you saw them at**  
 24 **the scene, of the left steer axle tire are different from**  
 25 **the appearance of the right steer axle tire?**

Page 67

1 A. Yes.

2 **Q. The left steer axle tire exhibits**  
 3 **characteristics of -- among other things -- a deflated**  
 4 **tire, correct?**

5 A. Yes.

6 **Q. There is no such appearance to the right**  
 7 **steer axle tire, correct?**

8 A. Correct.

9 **Q. And also to simplify this so we don't**  
 10 **lapse into something that we later find not**  
 11 **understandable, if we talk about steer axle, there's also**  
 12 **front tires. Are you okay with that for now, or would**  
 13 **you prefer to stay with steer axle?**

14 A. I prefer to stay with steer axle because  
 15 that way we have definition of axles.

16 **Q. Then we'll stay with steer axle. You do**  
 17 **characterize both steer axle tire marks, at least while**  
 18 **the vehicle is in the westbound lanes, as scallop marks,**  
 19 **correct?**

20 A. Yes.

21 **Q. I didn't see any place that you describe**  
 22 **the tire mark from the left steer axle as being evidence**  
 23 **of deflation except to the extent that you do comment**  
 24 **that you see rim marks. Is that fair?**

25 A. Yes. I don't use those words,

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1 specifically. I think it's understood.

2 **Q. In other words, if you say that a**  
 3 **tire -- if you say that a wheel is leaving rim marks, at**  
 4 **least under these circumstances, implicit in that is that**  
 5 **the tire is deflated?**

6 A. Yeah. I think that's a fair observation.

7 **Q. Do you have an opinion as to how quickly**  
 8 **this tire deflated?**

9 A. I don't, other than quick.

10 **Q. What does "quick" mean?**

11 A. Fast.

12 **Q. Can you quantify it?**

13 A. No, probably not. I could say that it  
 14 would be certainly something that would occur quicker  
 15 than the ability of the human perception to put a time  
 16 on.

17 **Q. Is there an accepted time definition**  
 18 **within your field for the term "blowout"?**

19 A. None that I'm aware of.

20 **Q. You testified that there may be some**  
 21 **evidence of a tread separation occurring while the**  
 22 **vehicle is still in the westbound lanes, although you**  
 23 **were hesitant to opine to a probability that there is**  
 24 **such evidence?**

25 A. That's not correct. That's not the



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1 question that was asked. The question you asked me was,  
 2 At these marks, is there evidence of tread separation?  
 3 That's a different question.  
 4 **Q. I agree it's a different question. I**  
 5 **thought I asked the other, but let me ask it to make sure**  
 6 **the record is clear.**  
 7 **Is there any evidence that you can point**  
 8 **to, that you can describe to a probability as a tread**  
 9 **separation occurring while the vehicle is in the**  
 10 **westbound lanes?**  
 11 A. In the westbound lanes?  
 12 **Q. Yes.**  
 13 A. Yes.  
 14 **Q. What is that evidence?**  
 15 A. There's several pieces of evidence,  
 16 actually. One is, in my opinion, the tread separation  
 17 produces an impact into the steering shaft and the U  
 18 joint which is part of that whole steering knuckle at the  
 19 top that is creating a fracture. And that fracture is  
 20 producing a failure at the spline for the steering input  
 21 shaft that goes from the base of that U joint into the  
 22 top of the steering gear box. That's producing the loss  
 23 of stable caster.  
 24 The second element that we see is we  
 25 actually can see that a piece of the fender -- or pardon

Page 70

1 me -- a piece of the tire had separated that was long  
 2 enough in its total length that it was able to strike and  
 3 remove and leave rubber transfer marks on the left front  
 4 bumper wraparound that is at the leading edge of the left  
 5 front fender for that vehicle.  
 6 We can actually see the unit number  
 7 painted on that piece of the fender and a piece of the  
 8 tire that is setting right adjacent to that fender which  
 9 is slightly downstream from the area where the initiation  
 10 of the marks are but before the vehicle crosses over into  
 11 the median.  
 12 **Q. Anything else?**  
 13 A. I think that's the evidence, in my  
 14 opinion, that supports that.  
 15 **Q. I want to go back to this issue about the**  
 16 **tire marks being made by the left steer axle tire while**  
 17 **the vehicle is in the westbound lanes.**  
 18 A. Uh-huh.  
 19 **Q. You've described those as scallop marks?**  
 20 A. Yes.  
 21 **Q. You've described them also as being**  
 22 **characteristic of a deflated tire?**  
 23 A. Yes.  
 24 **Q. And you've described that wheel as making**  
 25 **rim marks on the pavement?**

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1 A. That's correct.  
 2 **Q. And you have attributed the pattern of the**  
 3 **scalloping, as I understand it, to an imbalance in the**  
 4 **caster?**  
 5 A. That's correct.  
 6 **Q. Is there anything that you see in the tire**  
 7 **mark or marks made by the left steer axle while this**  
 8 **vehicle is in the westbound lanes that you see as**  
 9 **characteristic of a tread which is separating from a**  
 10 **tire?**  
 11 A. I don't have an opinion on that.  
 12 **Q. What is wheel hop?**  
 13 A. It's a layman's term for when you have  
 14 imbalanced mass transfer between wheels. It can either  
 15 be side to side or front to back.  
 16 **Q. Is there a vehicle dynamics terminology?**  
 17 A. I think that some people use that. Wheel  
 18 hop is typically where the weight is being transferred.  
 19 I think there's another term for that that vehicle  
 20 dynamics will use, but wheel hop may be that term.  
 21 **Q. You're talking tramp?**  
 22 A. Tramping, yes.  
 23 **Q. There's -- wheel hop is different from**  
 24 **tramp, correct?**  
 25 A. They're similar, but tramping usually is

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1 side to side. Wheel hop is usually weight transfer  
 2 that's from front to back, but I think that's -- or it's  
 3 vice versa.  
 4 **Q. Let me see if you will accept this.**  
 5 A. Okay.  
 6 **Q. Is wheel hop the vertical motion of a**  
 7 **wheel?**  
 8 A. Yes.  
 9 **Q. Is tramp the out-of-phase hop between the**  
 10 **two tires on the same axle?**  
 11 A. Yes, that's correct.  
 12 **Q. Are you prepared to accept those for the**  
 13 **purposes of this deposition?**  
 14 A. I am.  
 15 **Q. Okay. Is there any evidence that you see**  
 16 **of left steer axle hop?**  
 17 A. No.  
 18 **Q. Do you see any evidence of right steer**  
 19 **axle hop?**  
 20 A. I don't.  
 21 **Q. Do you see any evidence of tramp?**  
 22 A. No.  
 23 **Q. What would you see if there were tramp?**  
 24 A. If you had tramping, you would have the  
 25 frequency at which the right wheel and the left wheel are

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1 moving would be different. And these are moving in sync.  
 2 When you place this on, you can actually see where it's  
 3 in sync. And I understand that Mr. Scott believes  
 4 differently, but I think he's wrong. I think he's  
 5 misread the evidence.

6 **Q. Are you aware of -- let me preface this**  
 7 **and put it in context. Your report cited four**  
 8 **references?**

9 A. Yes.

10 **Q. Are there any other publications, tests,**  
 11 **or studies that you intend to refer to in connection with**  
 12 **your work in this case?**

13 A. Probably.

14 **Q. What?**

15 A. It depends. I have an additional one that  
 16 I put into my file in preparing for this deposition that  
 17 deals with brake actuation lag time and rise and all that  
 18 which deals with braking and how the air system in a  
 19 truck functions and how the compression of the treadle  
 20 valve is not commensurate with the application of brakes  
 21 like we have in a hydraulic system and the air system  
 22 requires buildup and rise and there's a lag time between  
 23 those which extends what we call the perception/response  
 24 time because that's added into it.

25 **Q. Your report didn't mention anything about**

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1 **perception or reaction time, correct?**

2 A. It doesn't because that's in response to  
 3 some of the issues that were provided in the supplemental  
 4 report that Mr. Scott -- that I received on Friday.

5 **Q. Do you intend to address**  
 6 **perception/reaction time in this case?**

7 A. I do.

8 **Q. Have you cited any literature related to**  
 9 **perception or reaction time or have you produced any**  
 10 **today?**

11 A. I haven't, but I can give some literature  
 12 right here, if you'd like.

13 **Q. Sure. Give me a list.**

14 A. Typically, what we function on with  
 15 perception/response time in the most typically reported  
 16 perception/response time is the Johansen studies that are  
 17 cited within the AASHTO manuals for design, and we have  
 18 both mean or the average driver response time as well as  
 19 what we call 85th percentile. For design, they function  
 20 on 85th percentile.

21 For the purposes of accident analysis, we  
 22 typically function on the average or mean. For a simple  
 23 event for an unexpected simple occurrence, where a driver  
 24 must decide what they are going to do, that time is  
 25 usually between about a second and a half to two and a

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1 half seconds. We usually default on the lower side of  
 2 that for most collision events. But as things become  
 3 more complicated, that time increases.

4 For a truck -- for instance, this  
 5 particular freightliner, as you're driving, you have --  
 6 if you decide you're going to brake, you not only have  
 7 the time period to decide that braking is your most  
 8 likely opportunity or what you need to do, but the  
 9 application of the treadle valve, which is an air valve  
 10 that floods the chambers that allows for the setting of  
 11 your brakes, when you apply that brake system, air  
 12 pressure has to build up in those chambers to be able to  
 13 push that push rod to be able to turn the torsion bar.  
 14 This goes in to turn the S cams to push the shoes onto  
 15 the outside of that drum.

16 That process -- the actual lag time  
 17 between pressing and the beginning of that air rise is  
 18 typically between one-tenth and two-tenths of a second.  
 19 Pressure will rise up to about 60 to 70 PSI, and the time  
 20 frame of about three-tenths to maybe as much as  
 21 five-tenths of a second.

22 So you have a time period of about a half  
 23 a second is what you're looking at between the time I  
 24 apply the brake and actual brake application occurs. So  
 25 that is -- that extends the reaction time, if you will,

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1 because it's part of that. And so a typical truck driver  
 2 will add in his reaction about a half second to the time  
 3 periods that we see in the Johansen study where they are  
 4 looking at drivers responding with either steering input,  
 5 et cetera, and that's the actual initiation of the  
 6 input.

7 **Q. When did Mr. Kehler apply a service brake**  
 8 **in this accident?**

9 A. That occurred, according to the ECM data,  
 10 about 2.2 seconds before the impact with the Chevrolet  
 11 Venture which is the Chevrolet Venture -- is that king  
 12 event that we see that is producing a change basically  
 13 for the ECM. We don't have any of the speeds, but it's  
 14 triggered. Part of that is triggered by a fault code,  
 15 and I believe that that fault code was an issue with  
 16 fluids which would have occurred when the Chevrolet  
 17 Venture and that left front steer axle wheel strikes the  
 18 Chevrolet Venture, rips that left rear wheel off of the  
 19 Chevrolet Venture as it spins and goes off to its final  
 20 rest and also pushes that left front wheel of the  
 21 freightliner back or rearward. And now we're going to  
 22 start having those fault codes.

23 And that 2.2 seconds places, based upon  
 24 the diagram you see here, places the initiation of  
 25 braking right in the middle of the median, no braking for

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1 that. And the ECM record only places braking at that  
2 point. So it's kind of that moment when you're already  
3 in the median, and there's nothing you can do.

4 **Q. What reliance, if any, do you place upon**  
5 **the absence of a hard brake event being recorded?**

6 A. I think that that's due to some of the  
7 anomalies we see in the ECM. I really think the ECM  
8 issue -- they communicate differently because you have  
9 three modules. And if you have interruption between the  
10 motor control unit and then you have the CPC 2 that's in  
11 this vehicle and they're not communicating, then one is  
12 not writing to the other. And speeds, switches, such as  
13 braking and clutch and all those are recorded by one but  
14 not the other.

15 And speeds are recorded by one but not the  
16 other. And when they go to write that permanent record,  
17 if there's an interruption in that communication, you  
18 lose that piece of the information. And I think that's  
19 what's occurred here, is that because of that occurring,  
20 we didn't have enough time to write in all those speeds  
21 which is the last thing that is done in recording that  
22 record.

23 **Q. When you say "interruption," you're**  
24 **talking about power interruption?**

25 A. Yeah, power interruption and communication

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1 interruption.

2 **Q. And so the fact that there's not a hard**  
3 **brake event recorded doesn't mean there wasn't a hard**  
4 **brake event as defined?**

5 A. That's correct, exactly.

6 **Q. And a hard brake event, as defined, would**  
7 **be what under -- with the equipment that was on this**  
8 **vehicle?**

9 A. I think it's 8 miles per hour per second  
10 is the rate at which braking should occur to trigger a  
11 hard braking event.

12 **Q. And is there a minimum speed the vehicle**  
13 **must be traveling in order to trigger that?**

14 A. Not for this vehicle here. But,  
15 obviously, you're going to have to be traveling greater  
16 than 8 miles per hour because you have to be able to  
17 decelerate 8 miles per hour per second. This is a 1  
18 hertz system for the speed, and so it's recording --

19 **Q. One hertz?**

20 A. One hertz, yeah. So that's one of the  
21 things you have to deal with.

22 **Q. So if this were a deceleration from 75 to**  
23 **67 in a second or less or from 10 to 2 in a second or**  
24 **less, it should trigger a hard brake event and record it**  
25 **if it weren't for a power interruption?**

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1 A. If it weren't for a power interruption.

2 **Q. Is it correct, given the decelerations you**  
3 **see here, at some point during this accident sequence,**  
4 **there should have been a recorded hard brake event but**  
5 **for the power interruption?**

6 A. That's correct. And that should have  
7 occurred either in the median or at impact with the Chevy  
8 Venture.

9 **Q. And that's -- when you say that that's**  
10 **where it should have occurred, is it because of what you**  
11 **told us before about the perception/reaction coupled with**  
12 **the delay and the application of the brakes or something**  
13 **else?**

14 A. Something else, but that is true.

15 **Q. Okay. What is the something else?**

16 A. The something else is that we actually can  
17 see -- which is a different system -- that the brake  
18 actuator is actually being applied 2.2 seconds before the  
19 impact with the Chevy Venture. And so if that was  
20 sufficient braking and sufficient deceleration of that  
21 vehicle, that should have triggered a hard brake event.

22 If the braking isn't sufficient to slow  
23 the vehicle down enough, then it will not trigger a hard  
24 braking event. That could also be a reason because we  
25 don't have the ability to slow that vehicle down.

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1 **Q. Do you have an opinion what you're stating**  
2 **to a probability as to what the driver's perception and**  
3 **reaction time was in this accident?**

4 A. I would say that it's reasonable to assume  
5 that somewhere between -- and taking into account brake  
6 lag, that if he's reacting really fast, that it's  
7 somewhere between a second and a half to two seconds.

8 **Q. When you say taking into account, I want**  
9 **to break this into -- I think you have three components,**  
10 **perception time, reaction time, and then effectiveness of**  
11 **the braking system given the brake system of this**  
12 **vehicle; is that right?**

13 A. Theoretically, yes.

14 **Q. How about practically? Are you saying all**  
15 **three components are at work here?**

16 A. Yes.

17 **Q. So what are you adding when you say**  
18 **theoretically?**

19 A. Theoretically, perception of reaction  
20 cannot be necessarily broken into two pieces. They are  
21 occurring simultaneously. There was a study that was  
22 done in 2009, I believe, where a gentleman -- part of his  
23 graduate work tried to make these algorithms for  
24 separating perception and then reaction. And what he  
25 actually found is that you can't because my perception

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1 and my reaction may be different than your perception and  
2 your reaction. But the cumulation of those two for me  
3 and you may be very similar. But it's just our ability  
4 to do each of those are different and characteristic for  
5 each individual.

6 So, typically, what we do is perception  
7 and reaction are combined as one element.

8 **Q. And in this case, you believe a fair**  
9 **number for perception and reaction, leaving aside the**  
10 **brake effectiveness component would be?**

11 A. A second to a second and a half. And  
12 that's assuming he's on the ball and being somewhat  
13 reactive normally.

14 **Q. Are there any other studies or authors or**  
15 **papers within the human factors field applying -- I'm**  
16 **sorry -- applied to drivers and looking at**  
17 **perception/reaction that you are comfortable citing? You**  
18 **gave us one.**

19 A. Yes.

20 **Q. Any others?**

21 A. Highway safety manual, which is also part  
22 of the AASHTO, deals with the same thing when you're  
23 looking at human factors as it relates to driver  
24 reaction. My master's is in traffic and highway safety.  
25 I have a lot of human factors analysis and study, so I'm

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1 very familiar with a lot of these studies.

2 And then Dr. Paul Olson did a number of  
3 studies. He came up with a specific number which I think  
4 from an average is probably all right. I think his  
5 number was 1.67 seconds or basically 1.7 seconds.

6 That's a best fit, but not everybody is  
7 going to react at that best fit. So, typically, from an  
8 engineering standpoint, because we are animals bound by  
9 boundary values, we like to give you a range.

10 And in my opinion, this is the most  
11 prudent and often quoted range for perceptual response  
12 time.

13 **Q. So you do have expertise, you've said, in**  
14 **the human factors field?**

15 A. Yes.

16 **Q. So you're familiar with Paul Olson's work?**

17 A. Yes.

18 **Q. Robert Delage?**

19 A. Yes.

20 **Q. Jeff Muttart?**

21 A. Muttart was actually the one I was  
22 discussing about the algorithms.

23 **Q. Out of A&M?**

24 A. I think he's out of A&M, yeah.

25 **Q. And you're aware that all three of those**

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1 **authors I mentioned say it's inappropriate to attempt to**  
2 **apply rules of thumb or average numbers for human**  
3 **perception/reaction time to an analysis of any individual**  
4 **accident?**

5 A. That's right. That's why you have to  
6 range it. And that's my point. I think Olson, when he  
7 came out with his initial paper -- I think he was with  
8 Michigan. I'm not sure -- his original paper came out  
9 with a 1.67. Of course, that was glommed onto and  
10 grabbed onto by the institutes like IPTM and  
11 Northwestern. So that became -- everybody reacts within  
12 1.67. You will see that a lot with police officers  
13 because that's what they're taught.

14 I think after he did that, he bit his  
15 tongue and wished he had never said that because that is  
16 a reasonable medium that some people will be a little  
17 quicker and some people will be a little slower; and so  
18 you need to establish that range.

19 I think Muttart's whole concept was to  
20 provide that range as much as he could from looking at  
21 the power curve analysis of what he had in his data. And  
22 he tried to separate out perception and response and  
23 realized you can't separate those, really. They are  
24 intrinsically related and very individual. And so these  
25 are your ranges.

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1 Certain things he did go through which I  
2 find interesting is he went through in his algorithms and  
3 looked at different kinds of events, different kinds of  
4 choices of what you can do, and how in those algorithms  
5 that may give you a range that's a little bit different  
6 than someone who has different situations, different  
7 elements to react.

8 **Q. And also all of those authors, you would**  
9 **agree, are of the school that it is necessary in order to**  
10 **evaluate perception/reaction time for any event to look**  
11 **at least at two major components being the individual and**  
12 **the task. Would you agree?**

13 A. I don't know if they specifically say  
14 that, but I will tell you that that is my opinion --

15 **Q. Okay.**

16 A. -- that the individual and the task are  
17 the elements that establish what that is. That's why I  
18 look at Johansen's study because Johansen's study looks  
19 at a bit system.

20 **Q. Let's talk about the reaction --**  
21 **perception and reaction time --**

22 A. Certainly.

23 **Q. -- as it relates to task.**

24 A. Uh-huh.

25 **Q. When you offer your number of a second,**



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1 second and a half, something like that, what types of  
2 tasks are you including within that?

3 A. In my opinion, the tasks that would be  
4 associated with this are -- first of all -- and I have to  
5 relate it specifically to this incident.

6 Q. Please do.

7 A. We have the failure of the tire. And as  
8 Mr. Kehler describes the boom, bang, bang, and as  
9 Mr. Marks describes the bang, bang, bang, that is  
10 occurring. So we have, first of all, the initiation of  
11 the event, what is occurring. And then once he  
12 experiences that, he has to decide what his reaction is  
13 to do.

14 And Mr. Kehler said, I turned right, but  
15 the vehicle continued to go left. And as hard as I  
16 turned right, it would not turn right and it continued to  
17 turn left. So now what is the next option I have to do?

18 So now he has a couple of different  
19 conditions that he's looking at to decide what he's going  
20 to actually execute in the process. And then that would  
21 lead to the reaction once he's entering the median of  
22 braking.

23 And so I think the time period there might  
24 be a little bit more to the second, to the second and a  
25 half, but I think when you look at brake lag time and

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1 pressure build up, it actually fits the timing for this  
2 vehicle's event at 78.4 to 75 miles per hour.

3 Q. When you say that you think that will be a  
4 little bit longer, what will be a little bit longer?

5 A. The perception -- the decision -- the  
6 response, I guess, the decision -- I like how the highway  
7 safety manual goes about the process. You have  
8 detection, identification, decision, and response, DIDR.

9 So detection is, boom -- or in the case of  
10 Mr. Marks, bang, bang, bang. That's detection.

11 Identification, I have a wheel blowout.  
12 Then decision, what is occurring, what do I need to do,  
13 and then response, to take my appropriate action or the  
14 action I decide to do according to that information that  
15 I've just processed.

16 Q. How long -- what was the  
17 perception/reaction time to the point where Mr. Marks  
18 attempted steer input?

19 A. That I can't tell you.

20 Q. Why?

21 A. Because there's no evidence of any  
22 steering input.

23 Q. There's testimony that he put it in steer.

24 A. I understand that, but there's no evidence  
25 on the roadway of any steering input, not by the driver.

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1 Q. What causes the first movement of the  
2 vehicle in a counterclockwise direction?

3 A. That's due to the fact that we have loss  
4 of integrity of the tire which is creating drag, and that  
5 drag at the left front creates left steer. So you blow  
6 your left front tire. It creates a left steer. You blow  
7 your right front tire, it creates a right steer, because  
8 of the imbalance drag on those steer axle tires.

9 Q. When does the fracture steering knuckle  
10 spline occur?

11 A. Somewhere between the point of the  
12 initiation of where our marks are on the roadway and  
13 where we see the tire marks starting to curve towards the  
14 left.

15 Q. Where do the tire marks start to curve to  
16 the left, as you've described?

17 A. Let me show you in my diagram and in my  
18 photographs here.

19 Q. Okay.

20 A. We are looking at HA 000863 from Exhibit  
21 263.

22 Q. I'm going to modify what we're doing  
23 before. I'm sorry for the interruption. But let's just  
24 go ahead and mark that second exhibit you just started  
25 talking about as a separate exhibit.

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1 (Exhibit 264 marked.)

2 Q. So 264 is another print of a photo taken  
3 by whom?

4 A. This is Wyoming Highway Patrol. They took  
5 this after my investigation, after I had been to the  
6 scene. It was the next day, but after.

7 Q. So this is November 9, 2014?

8 A. That's correct.

9 Q. And you were using this photograph to tell  
10 us or show us what?

11 A. We're seeing the initiation of the tire  
12 marks, and there's a slight gap. And I'm going -- can I  
13 mark on this?

14 Q. Please.

15 A. I'm going to mark for you a gap here.  
16 There's a gap that's occurring between the initial marks  
17 that we see from the gouges and the initial tire mark  
18 where the orange and the first incipitation, if you will,  
19 of the darkest tire marks, and they start to curve off  
20 towards the left.

21 Q. And is it your opinion that by the time of  
22 where that mark starts curving left, which is from the  
23 top line on Exhibit 246, that at that point, the steering  
24 knuckle spline has fractured?

25 A. Yes.



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1 **Q. So by that time, Mr. Marks has attempted**  
2 **to put in left -- I'm sorry -- right steer?**  
3 A. Probably not.  
4 **Q. Okay.**  
5 A. That's too short of a period of time.  
6 MR. KLINE: You meant Mr. Kehler?  
7 MR. BROSSEAU: Mr. Kehler. Thank you.  
8 A. If you will, in Wyoming, the dash marks  
9 you see in the roadway are approximately 10 feet. The  
10 gap is 30 feet between those dashes, which is a standard  
11 skip gap but not every state is that way.  
12 **Q. (By Mr. Brosseau) But is 40 feet,**  
13 **roughly, from the beginning of one lane divider mark to**  
14 **the beginning of a next lane divider mark?**  
15 A. Roughly. And that usually is the case in  
16 the state of Wyoming.  
17 **Q. Okay.**  
18 A. And if we look at the first line -- and  
19 that first line I'm going to mark as A. And the second  
20 line I'm going to mark as B. And if we look at the gap  
21 where A is in that gap, it is approximately 80 percent of  
22 that gap. So if we have 30 feet, we're looking at  
23 approximately 6 feet. And then I take approximately  
24 halfway through the skip which is 5 feet, that's a  
25 distance of somewhere between -- that's approximately 11

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1 feet there. But that's a distance of somewhere  
2 between -- we can reasonably say 10 and 15 feet.  
3 **Q. From?**  
4 A. From the initial marks --  
5 **Q. A?**  
6 A. -- that we see at A, which are the rim  
7 gouges, to the point when the tire marks begin to curve  
8 to the left. If we're traveling, say -- let's use 15  
9 because that's going to give us our longer period of  
10 time.  
11 If we're traveling at 78.4 miles per hour,  
12 that gives us a time period of about one-tenth to maybe  
13 1.13 seconds of time between when that tire deflates,  
14 hits the road, and the vehicle begins to turn left.  
15 **Q. Okay. So 78.4 miles per hour, this**  
16 **vehicle is traveling roughly 111 feet per second?**  
17 A. That's correct.  
18 **Q. And if it's traveling 15 feet, then it**  
19 **tells us it's traveling at about, what, an eighth of a**  
20 **second? Is that what you calculated?**  
21 A. .13.  
22 **Q. Okay. About an eighth of a second?**  
23 A. I don't know what an eighth is --  
24 **Q. .125 is an eighth, right?**  
25 A. I don't know. That's probably right.

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1 **Q. That's fine if you don't know.**  
2 A. I don't deal with the fractions. I deal  
3 with the decimals, but that's about right.  
4 **Q. So did Mr. Marks steer by the point that**  
5 **you've marked B on Exhibit 264?**  
6 MR. KAPP: Mr. Kehler.  
7 MR. BROSSEAU: Mr. Kehler. Thank you.  
8 A. No. He could do no physical input by that  
9 time.  
10 **Q. (By Mr. Brosseau) So if the marks that**  
11 **you show as beginning at B, are those the marks from a**  
12 **sign of a tire which is experiencing caster imbalance?**  
13 A. Yes.  
14 **Q. And is it experiencing caster imbalance**  
15 **resulting from a fractured steering knuckle spline?**  
16 A. In my opinion, yes.  
17 **Q. So it is not probable that the driver**  
18 **inputted any steer to cause that steering knuckle spline**  
19 **to fracture, correct?**  
20 A. No.  
21 **Q. It's not correct?**  
22 A. That's correct.  
23 **Q. So the driver could have inputted steer to**  
24 **cause that steering knuckle spline to fracture at Point**  
25 **B?**

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1 A. No. I need to explain, if I may.  
2 **Q. Please do.**  
3 A. It's not that the driver is necessarily  
4 inputting steer. It's that the driver's grasp on the  
5 steering wheel to keep it straight transmitted through  
6 the steering shaft into the universal joint from the  
7 universal joint through that steering input shaft spline  
8 into the steering box which is power assisted with the  
9 fluid with the torsion bar that's on the inside that  
10 allows flow. Once that wheel hits and begins to turn,  
11 the driver is still steering straight but the wheels  
12 begin to move left. That induces a torque.  
13 And that torque is induced not by  
14 volition, but by the mere fact that the driver's holding  
15 onto the steering wheel and is actually magnified due to  
16 the fact that we have the power assist.  
17 **Q. Is it your opinion that the -- what's**  
18 **resisting -- strike the beginning.**  
19 Is it your opinion of what's resisting the  
20 turn of that steering wheel's effectiveness to turn is  
21 the tire and rim in contact with the roadway?  
22 A. No.  
23 **Q. What is resisting the steering wheel to**  
24 **turn?**  
25 A. There's no ability for the driver to steer

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1 because he's no longer connected to the steering box.  
 2 **Q. I'm talking about before the disconnection**  
 3 **occurs. As I -- let me see if I can understand your**  
 4 **report correctly. As I understand your report, you're**  
 5 **saying that this vehicle went left and exited the roadway**  
 6 **and eventually crashed into two other vehicles because**  
 7 **the steering knuckle spline was fractured, preventing the**  
 8 **driver from being able to steer and keep his vehicle**  
 9 **under control; is that right?**

10 A. I think that's what I just stated, yes.

11 **Q. And there are two possibilities --**  
 12 **reasonable possibilities or, in your case,**  
 13 **probabilities -- you prefer that term, I assume?**

14 A. Yes.

15 **Q. Two probabilities for what caused that**  
 16 **steering knuckle spline to fracture, correct?**

17 A. Yes.

18 **Q. One of which is that there was tread**  
 19 **separating from the left steer axle tire which impacted**  
 20 **some part of the steering system -- we can talk later**  
 21 **about exactly what that was -- but it impacted some part**  
 22 **of the steering system which fractured the spline?**

23 A. That's correct.

24 **Q. And the other reasonable probability is**  
 25 **that the driver steering, whether by holding it straight**

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1 **or trying to steer to the right, somehow caused the**  
 2 **fracture of that spline?**

3 A. No. I think you're misunderstanding my  
 4 report.

5 **Q. It sounds like it if you say no.**

6 A. I believe that there's a combination of  
 7 two. And I can see on the fracture face surface that  
 8 there's not only shear, but there's also torque. And  
 9 this is again where -- I think Mr. Scott is significantly  
 10 underestimating or misinterpreting the data.

11 We can see a couple of different things.  
 12 We have what are called torque witness marks which are  
 13 part of the -- when a torque occurs, you will see these  
 14 striation lines that are part of that initial fracture  
 15 face. But we also see shear that is coming into the  
 16 initial portion of the fracture. And then the back  
 17 portion of that fracture is just essentially what we call  
 18 catastrophic failure.

19 That's the part that's rough and looks  
 20 like sandpaper. That is as a result of the fact that the  
 21 materials can no longer hold their integrity. They just  
 22 don't have that ability and they just come apart. And so  
 23 when we look at the fracture face, we can see very  
 24 distinctly a very small area where shear and rotation due  
 25 to torque in that system is causing that. That's why we

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1 call it a Mode 3 failure. Mode 3 is kind of a catch-all.  
 2 It means that we have more than just one element that's  
 3 occurring here.

4 In my opinion, it's both shear and torque.  
 5 So the driver holding onto the steering wheel in and of  
 6 itself and by itself is not likely to produce torque  
 7 enough to fracture that unless we have a faulty material,  
 8 meaning that the spline is faulty. And that would be a  
 9 products issue for TRW and also for freightliner.

10 However, because we had a tire failure on  
 11 the right before and that didn't occur, I think that's  
 12 unlikely. But what we see here, in my opinion, is both  
 13 shear and torque that's occurring. And at that small  
 14 portion of the initial fracture face, I believe that  
 15 that -- we can show, and I can show you that evidence of  
 16 where that is occurring.

17 **Q. Is this failure of the steering knuckle**  
 18 **spline something that would not have occurred had the**  
 19 **tread not interacted with it?**

20 A. It would not have occurred, I agree.

21 **Q. So this did not occur just because the**  
 22 **driver was trying to steer the vehicle?**

23 A. No, I don't believe so. I mean, that can  
 24 occur. I actually did a case here in Denver where that  
 25 occurred. But that was an issue because somebody tried

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1 to mess with the steering box, and thought they could  
 2 adjust it -- they weren't a mechanic -- and it actually  
 3 popped right out of -- the spline popped right out. So  
 4 there's a screw that goes in so that those teeth of the  
 5 spline, when it goes in to be able to turn the worm gear  
 6 that goes inside of the steering box -- when that set  
 7 screw comes in and it hits between two of those teeth on  
 8 the spline, it keeps the spline from popping out. And  
 9 that's the only time that I've seen that.

10 I actually distorted and twisted the teeth  
 11 and it popped right now, but I don't think that we have  
 12 that issue here.

13 **Q. Is this failure ductile or brittle?**

14 A. Well, there's a brittle section of it  
 15 which is the back section, but the ductile portion of it  
 16 is in front, meaning the shear. The shear that's  
 17 occurring is deforming it in the front and then the  
 18 torsion. But the back portion of it is pure brittle in  
 19 the back, because it just -- the failure of the material  
 20 just pops off. It's a tempered steel.

21 **Q. So it first experiences a ductile failure**  
 22 **and then a brittle?**

23 A. I don't like to use those terms. I like  
 24 to use the terms the shear and torque as your initial  
 25 Mode 3 failure that's occurring in the front. The back

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1 portion is basically failed because the materials can no  
2 longer hold onto the other portion of the material.

3 **Q. Why don't you like using terms "ductile"**  
4 **and "brittle"?**

5 A. Because I don't think they're very  
6 descriptive for jurors. I don't think they understand  
7 that. I think they understand the other portions, and I  
8 tend to use those because a juror can understand shear,  
9 because they've all used scissors. They all understand  
10 that those are parallel opposing forces.

11 They can also understand something that's  
12 being twisted and broke because they probably broke a  
13 stick or broke the barrel of a pen. And they've  
14 understood how some of those are occurring.

15 Here I have a different kind of mode, but  
16 if I put a mode in that's one secured and the other hits,  
17 I have equal and opposite forces, which, in my opinion,  
18 is occurring here which is producing shear. Once it  
19 starts to fail at the leading portion of where that is  
20 being applied, the remaining portion of it just simply  
21 cannot hold on, and it's brittle from the standpoint that  
22 it just breaks like glass does because it doesn't have  
23 the integrity to hold on.

24 **Q. Understanding that you may not want to use**  
25 **the terms because jurors don't follow it, you certainly**

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1 **do have an understanding as an engineer, correct?**

2 A. Yes.

3 **Q. Okay. What is a ductile fracture as an**  
4 **engineer?**

5 A. I'm not sure what the actual definition  
6 is. I just don't use them. I mean, brittle is  
7 usually -- the ductile fractures are more fractures based  
8 on shear, fatigue. We see that where something is  
9 bendable. It's ductile. And so you see bending shear or  
10 bending fractures. If we're looking at something that is  
11 torsion, shear, if we're looking at something that is  
12 ductile, it has the ability to bend.

13 **Q. And, similarly, are you unable to give me**  
14 **a definition of brittle?**

15 A. No. Brittle is something that can't bend  
16 and sort of like concrete. It does have some elasticity.  
17 But when it breaks, it breaks with a brittle face,  
18 meaning it does not resist bending forces very well.

19 **Q. What are the characteristics of a brittle**  
20 **face?**

21 A. Typically, it's very rough like sandpaper.  
22 And it has a tendency to be irregular or it can, in this  
23 particular case, be across an entire surface. But it has  
24 a stippled face to it. It looks pitted almost because  
25 it's rough. That's where it's breaking because it no

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1 longer has its integrity to hold on like concrete does.

2 **Q. What is the time between the shearing**  
3 **failure and the torsional failure?**

4 A. I believe they're occurring at the same  
5 time. They're simultaneously. That's why it's a Mode 3.  
6 These are all occurring at once.

7 **Q. And is the brittle and the ductile**  
8 **occurring at the same time?**

9 A. No. The ductile portion of the shear  
10 that's occurring initially occurs before the remaining  
11 portion. The entire failure event has those modes in it.  
12 But the shear begins the brake, and then the force that's  
13 being applied continues until it can no longer hold on  
14 and then it becomes brittle and breaks off.

15 **Q. And has the steering knuckle spline, then,**  
16 **failed on or before the time we see on Line B, Point B,**  
17 **on Exhibit 264?**

18 A. I don't know. It could have failed there  
19 or it could have failed shortly after. And here's the  
20 reason why. There isn't enough time between A and B for  
21 a driver to respond. Say, if I'm responding in an  
22 instinctive manner, half to three-quarters of a second.

23 **Q. Or .2 to .25 in the case of things like**  
24 **rumble strips or potholes, correct?**

25 A. Well, that's something that's expected.

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1 **Q. Rumble strips are expected?**

2 A. Yeah, sure. If you're driving down the  
3 roadway and you hear a rumble strip, you know what this  
4 is. You don't have to decide what it is. But if you're  
5 driving down the roadway and you have a failure to a tire  
6 that's occurring, you don't know what that is yet.  
7 That's a little bit different.

8 Rumble strip I know is on the side of the  
9 roadway and I may hit a rumble strip, but I know it's a  
10 rumble strip and I know I've drifted. But if I'm driving  
11 down the roadway and I have a tire failure, I don't know  
12 it's a tire failure until already I'm starting to lose  
13 control.

14 **Q. You know if you're losing your horizon,**  
15 **your horizon is deviated.**

16 A. You don't know immediately. It takes time  
17 to perceive.

18 **Q. How long does it take you?**

19 A. I don't know, and I would say that -- I  
20 would personally say that it's going take at least a half  
21 a second for someone to be able to start detecting that  
22 their horizon is changing, as you put it, or their  
23 position of roadway. It's not going to be immediate.  
24 Nothing we do is immediate.

25 And so if we are looking at the response

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1 to something from that -- I don't remember the original  
 2 question now. I'm sorry.  
 3 **Q. I'll start another way.**  
 4 **Is driving an iterative task?**  
 5 A. Yes.  
 6 **Q. What does that mean?**  
 7 A. That means you have many different things  
 8 that you're inputting into the task in order to  
 9 accomplish one goal.  
 10 **Q. And it also means that we are -- in the**  
 11 **case of driving down the road, we are making constant**  
 12 **steering corrections, correct?**  
 13 A. That's part of it, but we're also  
 14 monitoring traffic to know whether our lane position is  
 15 where we want to be. We're also determining whether  
 16 traffic is approaching from the front, the rear, to the  
 17 side. We may be looking at the scenery. We may be  
 18 determining where we are on the roadway in anticipation  
 19 for an exit. Part of that is the navigation process,  
 20 obviously. And it's also scanning the road ahead to look  
 21 for objects and obstructions or any circumstances that  
 22 may be out of the ordinary.  
 23 **Q. And is it testimony in this case, given**  
 24 **your opinions regarding perception and reaction time,**  
 25 **that until this driver, Mr. Kehler, recognized that there**

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1 **was an issue, could identify it as a tire, and make a**  
 2 **decision as to what to do, he did not steer?**  
 3 A. With the caveat of what I discussed  
 4 before, yes.  
 5 **Q. Which caveat?**  
 6 A. The caveat is that he's holding onto the  
 7 wheel while the wheel is turning.  
 8 **Q. He didn't make a volitional decision to**  
 9 **turn the steering wheel left or right until after he**  
 10 **recognized an issue, perceived it was a tire, and made a**  
 11 **decision as to what to do; is that your testimony?**  
 12 A. There's one other element.  
 13 **Q. Go ahead.**  
 14 A. The sensation of the vehicle moving to the  
 15 left as well, so that's another element.  
 16 **Q. And additive element?**  
 17 A. Yes.  
 18 **Q. That would lengthen the time from**  
 19 **beginning of perception to the end of reaction?**  
 20 A. Probably not.  
 21 **Q. Is it included with one of the other three**  
 22 **components?**  
 23 A. I think it's part of the perception, the  
 24 identification, and that -- first we detect it and then  
 25 we have to identify, and so it's part of that

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1 identification.  
 2 **Q. In this case, when did Mr. Kehler first**  
 3 **perceive that something was going on?**  
 4 A. Probably at least a brief period of time.  
 5 That could be half a second. I mean, he knows -- he  
 6 perceives that something has happened, has heard the  
 7 noise. That doesn't necessarily mean that it's  
 8 registered yet. So there's going to be a time period  
 9 down there. And I don't have a specific time for you.  
 10 There's no way I can give you a specific time. I can  
 11 estimate.  
 12 **Q. Was Mr. Kehler's first awareness of**  
 13 **something going on a vibration or a noise?**  
 14 A. I think he said he felt a vibration and  
 15 then the noise almost immediately after.  
 16 **Q. How far was the vibration east of the**  
 17 **circles that you've put on Exhibit 263?**  
 18 A. I cannot tell you.  
 19 **Q. Can you approximate it?**  
 20 A. Cannot.  
 21 **Q. Is it miles?**  
 22 A. He said it was almost immediate, so I'm  
 23 pretty certain it's not miles. But it's probably  
 24 measured in feet.  
 25 **Q. When you say probably, it's your opinion**

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1 **that it was probably feet?**  
 2 A. Well, based upon his observation.  
 3 **Q. There's no physical evidence that you**  
 4 **could answer that question; is that correct?**  
 5 A. That's correct.  
 6 **Q. So we're relying upon his testimony?**  
 7 A. That's all we have.  
 8 **Q. And when you say it probably was, you're**  
 9 **making some -- you've formed some impressions based upon**  
 10 **his testimony?**  
 11 A. Well, not just his, but also Mr. Marks'.  
 12 Mr. Marks comports with Mr. Kehler -- comports with his  
 13 testimony, and that's all we have. We have no physical  
 14 evidence to refute what they say.  
 15 **Q. If he experienced a vibration before the**  
 16 **marks you placed in Exhibit 263, does that mean a tread**  
 17 **sep preceded a deflation?**  
 18 A. Yes. That would indicate to me it  
 19 probably did.  
 20 **Q. Okay.**  
 21 A. It started to separate or at least the  
 22 profile of the tire is changing.  
 23 **Q. Meaning going out of round?**  
 24 A. It's either going out of round or it's  
 25 changing its ability to grip the road. May I --



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1 **Q. Certainly.**

2 A. When we have a tire patch, the tire patch  
3 deforms, and it drags slightly behind the direction of  
4 travel at high speed.

5 **Q. We're going to get into pneumatic trail**  
6 **now?**

7 A. We are.

8 **Q. Okay.**

9 A. We're going to discuss that a little bit.  
10 And so when I set a vehicle down on the roadway, the  
11 contact patch that is generated by the contact between  
12 the surface of that tire and the surface of the roadway  
13 static is essentially directly down. It's set directly  
14 down from the hub vertically.

15 Once I start to move that vehicle, then  
16 that contact patch due to the deformation of the  
17 materials in the tire starts to lag behind that center  
18 point and that creates what we call pneumatic trail.

19 That means the center of the contact point  
20 is actually setting behind the vertical center line at  
21 the hub. That's a process of a flexible material.

22 So that's the issue of the pneumatic  
23 trail.

24 **Q. So how does pneumatic trail address the**  
25 **question of whether we have a tread sep versus a blowout?**

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1 A. Well, as I deform that patch, if I start  
2 having separation, the patch characteristics change. So  
3 let's say I have a separation at one portion of the tire  
4 and not on all of the others -- let's say it's a small  
5 patch. Maybe it's a foot long, the circumference, just  
6 for example. Each time that wheel rolls over, the  
7 deformation of that contact patch at the roadway changes.  
8 Because now no longer is it in contact with the tire;  
9 it's actually going to distort more.

10 So each time I roll over, I feel this bump  
11 because the pneumatic trail is changing and it will  
12 change at a regular rate. And as that wheel is spinning,  
13 I sense the vibration. And that change in the pneumatic  
14 trail either produces -- while in this case it would  
15 produce a significant difference in camber, which would  
16 mean that I would probably go closer to a negative camber  
17 in this particular case which is going to cause my wheel  
18 to shimmy, vibrate -- not camber -- caster. It's going  
19 to cause that wheel to vibrate.

20 That brings up another point. When you  
21 change camber, you change caster. When you change caster  
22 and camber, you change tow. Every little thing affects  
23 every little thing in the dynamics. That's one of the  
24 phrases we like to use.

25 So when that occurs, that creates a

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1 vibration, and that can be sensed as that continues to  
2 grow. At very small levels, I may not feel it because  
3 I'm somewhat insulated from that particular contact with  
4 the roadway through the friction and the steering gear  
5 box and the power assist. But we try to not insulate the  
6 driver so much they don't have a good feel for the road.  
7 **Q. Are you aware of any literature that**  
8 **addresses the issue or reports results of any studies**  
9 **regarding the occurrence of noise and vibration preceding**  
10 **the detachment of tread from the tire and tread**  
11 **separation?**

12 A. Not specifically. I didn't review any  
13 specifically for this case, so I can't answer that. But  
14 I somehow recall an SAE paper that was done in -- I want  
15 to say the late '80s. I may be confusing that with  
16 something else.

17 **Q. Tell me what you recall with whatever that**  
18 **paper was.**

19 A. I can't really tell you the specifics of  
20 it.

21 **Q. Can you tell us how long it takes a tire**  
22 **to separate or this tire to separate?**

23 A. No.

24 **Q. Can you approximate it at all?**

25 A. No.

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1 **Q. Are you aware of any literature or any**  
2 **studies relating to perception/reaction time involved in**  
3 **tire tread separations?**

4 A. No.

5 **Q. Are you aware of any literature or any**  
6 **studies that report how drivers respond by simulator, by**  
7 **actual event, by anecdotal studies to tire tread**  
8 **separations?**

9 A. Yes.

10 **Q. What do you know in that regard?**

11 A. I'm familiar with the same studies that  
12 were quoted by Dr. Gillespie and also by John Scott  
13 discussing the issues of controllability with a steer  
14 axle tire failure. I agree completely. If you have  
15 steering integrity, most drivers -- a skillful driver  
16 will certainly be able to control that vehicle and be  
17 able to bring that vehicle to a safe stop.

18 **Q. Are you aware of any literature on those**  
19 **issues other than that cited by Mr. Scott and Dr.**  
20 **Gillespie?**

21 A. I can't tell you what they are, but I'm  
22 certain there probably is other literature.

23 **Q. Are you aware of any authors of any of**  
24 **those other studies other than those cited by Mr. Scott**  
25 **and Dr. Gillespie?**



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1 A. No. I'm sure there are, but I'm not  
2 familiar with them.

3 **Q. We talked about rumble strips. Are you**  
4 **familiar with Dr. Samala?**

5 A. Possibly.

6 **Q. Are you familiar with any**  
7 **perception/reaction time studies related to the rumble**  
8 **strips?**

9 A. Yes, from TRB, Transportation Research  
10 Board.

11 **Q. What can you cite there?**

12 A. I can't cite anything, but I recall  
13 addressing some of these at the design class I had back  
14 in the '90s, addressing issues of rumble strips for the  
15 purpose of alerting drivers as they may diverge to the  
16 outside edges or the inside edges of the roadway, but  
17 that's been 20-some-odd years ago.

18 **Q. Is there any published material that**  
19 **you're aware of?**

20 A. TRB has a lot. And I would imagine if you  
21 search in the TRB literature that you can find issues  
22 dealing with rumble strips, because I know that that was  
23 a major focus in the '80s and '90s for highway safety and  
24 part of the highway safety improvement.

25 **Q. So if I wanted to find that literature,**

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1 **look in TRB for the '80s and 90s, and I'm likely to find**  
2 **driver perception/reaction time related to rumble strips?**

3 A. I think all you have to do is probably --  
4 well, I don't know about driver perception/response, but  
5 I do know about -- well, I would imagine it would have  
6 driver perception/response. I'm trying to think of what  
7 we did. It's not an issue I normally work with, so bear  
8 with me.

9 **Q. Sure.**

10 A. I believe part of the studies were done by  
11 the Texas Highway Safety Institute, which is Texas A&M at  
12 Riverside, doing some of those studies. I believe that  
13 was in the '80s.

14 **Q. TTI?**

15 A. Pardon?

16 **Q. Texas Traffic --**

17 A. Well, back then it was --

18 **Q. -- Transportation Institute?**

19 A. Well, that's what it is now. But back in  
20 the day, it was not TTI. It was the Texas Transportation  
21 Safety Institute. TTSI, I think is what it was or they  
22 left the S out. But their studies -- they do a lot of  
23 stuff with not only pavement types, but they do a lot of  
24 barrier impact for guardrails and attenuation devices, et  
25 cetera. They've done a lot of that. They even did

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1 mailboxes which is an interesting one as well.

2 But I believe those studies may have come  
3 from there, but I'm not positive. If you Google actually  
4 what you're asking for, you will probably come up with a  
5 number of TRB studies, probably studies all over. There  
6 may even be some Federal Highway Administration studies  
7 as well as some studies from -- I'm not sure if the  
8 Institute of Transportation Engineers would have done  
9 that or ASCE, but there's potential.

10 **Q. Let's go back to Exhibit 264. As I**  
11 **understood your testimony, you said that at Point A,**  
12 **which was marked by the police of orange paint and which**  
13 **you identified, that's the point where the first**  
14 **documented physical evidence of this accident appears?**

15 A. Correct.

16 **Q. And at Point B -- also at Point A, you see**  
17 **evidence of rim gouging from both the inside and outside**  
18 **inboard and outboard flanges of the left steer axle**  
19 **wheel?**

20 A. Correct.

21 **Q. And you circled those on Exhibit 263. You**  
22 **also find tire marks that begin there. And then it's**  
23 **characteristic changes at the point you identified as B**  
24 **on 264.**

25 A. It begins to curve, correct.

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1 **Q. And is the change that occurs at Exhibit**  
2 **(sic) B the result of the fractured steering spline?**

3 A. No.

4 **Q. What causes the change at B?**

5 A. That's our imbalance caster, and -- not  
6 our imbalance caster yet. It is our issue of the  
7 oversteer that's produced by the failure at the left  
8 front which is causing that left steer because we have  
9 drag at the left front wheel.

10 **Q. Has the vehicle gone oversteer**  
11 **at that point?**

12 A. It's approaching oversteer at that point.

13 **Q. Meaning it's still neutral?**

14 A. It's probably going towards neutral into  
15 oversteer.

16 **Q. And it's coming from understeer?**

17 A. It's coming from -- well, there's no steer  
18 initially. Understeer/oversteer only occurs when you  
19 have a turn. But when it's turning, we have a drag at  
20 left front. And the drag at the left front causes the  
21 steer axle tires to turn to the left. That's redirecting  
22 the front of the cab towards the left.

23 As it is developing into that left turn  
24 very quickly, you'll have the oversteer issue because no  
25 longer now do we have much control with the front. The

1 rear axle -- the drive axles start taking over the steer.  
 2 When a vehicle steers -- if I may use  
 3 Exhibit 261, we have a slip angle in front, and we have a  
 4 slip angle at the rear. You will notice in this case, a  
 5 left steer, the slip angle that's generated between the  
 6 direction of the tires, typically we want that to be  
 7 significantly larger than the opposite direction that we  
 8 have of a slip angle for the rear.

9 So during a steer, you actually will have  
 10 the front tires turning one direction and the rear tires  
 11 are inducing a slip and a turn in the opposite direction,  
 12 unless you have quadsteer.

13 **Q. Actually, a vehicle which is parked at the**  
 14 **curb and not driving at all has a steer gradient,**  
 15 **correct?**

16 A. Sure, it does, but it is a low speed steer  
 17 gradient that is controlled primarily by the Ackermann  
 18 angle. It's only entirely by the Ackermann angle. But  
 19 here when we're looking at high speed, we have other  
 20 elements. We have the Ackermann. We have the slip  
 21 angles and the difference of those slip angles which is  
 22 producing what our direction of those tires are with  
 23 respect to the direction of which the vehicle is moving.

24 **Q. With respect to steer gradient, what does**  
 25 **linear range understeer mean?**

1 A. What is linear range understeer? That's  
 2 when I'm in -- typically they're doing that in a swept  
 3 steer. When I'm turning a vehicle, the linear range is  
 4 not the transient portion but within the portion where my  
 5 steer is established, and I'm continuing in a safe  
 6 continued steer. You used to do it with steer pads.

7 They take a stopper and return the wheel  
 8 and you lock it to the stopper. There's a transition  
 9 that we call the transient period where the turn will  
 10 actually peak the forces on the outside higher than the  
 11 inside and then it will rest back. And it changes all of  
 12 those dynamics.

13 And so once I'm in that constant steer,  
 14 that is -- that's the linear portion. That means the  
 15 steer is set; it is not changing. There's a transient  
 16 period of being able to transition into the steer where  
 17 those forces will peak. That's the most critical part  
 18 where yaw is often induced.

19 **Q. Are the limits of linear range -- and by**  
 20 **that, I mean the lower and upper portions of linear**  
 21 **range -- defined by lateral acceleration?**

22 A. Say that again.

23 **Q. Is the bottom and the top of a linear**  
 24 **range defined by a lateral acceleration as we're talking**  
 25 **about linear range understeer?**

1 A. I'd have to look at the equation.

2 **Q. Let me ask you, did this vehicle, up until**  
 3 **Point B, ever experience or exhibit an oversteer**  
 4 **characteristic with oversteer defined as J 670?**

5 A. In my opinion, yes. And that's occurring  
 6 when we see the beginning of the marks of the drive axles  
 7 coming up from the outside.

8 **Q. After Point B then?**

9 A. After Point B.

10 **Q. So at Point B this vehicle has not yet**  
 11 **exhibited evidence of being an oversteer vehicle?**

12 A. I think it's starting at about Point B,  
 13 actually.

14 **Q. Is the first evidence you have of this**  
 15 **vehicle being an oversteer vehicle when the drive axle**  
 16 **marks first appear?**

17 A. Yes.

18 **Q. By the time the drive axle marks appear,**  
 19 **has the steering knuckle spline fractured?**

20 A. Probably.

21 **Q. Is it the fracture of the steering knuckle**  
 22 **spline that causes this vehicle to become oversteer?**

23 A. It contributes to it, yes. Every little  
 24 thing contributes to every little thing, and I believe  
 25 so, yes.

1 **Q. What other than the fracture steering**  
 2 **knuckle spline contributed to this vehicle becoming**  
 3 **oversteer?**

4 A. The inability of the driver to be able to  
 5 react to the countersteer.

6 **Q. And what contributed to the inability of**  
 7 **the driver to react with countersteer?**

8 A. The fracture of the spline at the -- for  
 9 the input shaft at the top of this steering gear box.

10 **Q. So did anything other than the fracture of**  
 11 **the steering gear input shaft or steering knuckle spline**  
 12 **cause or contribute to this vehicle becoming oversteer?**

13 A. Yes.

14 **Q. What?**

15 A. I described that previously. That's the  
 16 loss of our caster balance. Once you lose the left front  
 17 tire and the ability of the left front tire to steer,  
 18 your slip angle at the front decreases, and that means  
 19 the slip angle at the rear remains what it can -- so it  
 20 becomes the dominant feature.

21 And when you have a dominant rear steer  
 22 angle compared to the -- slip angle as compared to the  
 23 front axle slip angle, that is the definition of an  
 24 oversteer condition.

25 **Q. Would you agree that a rear axle tread**

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1 separation or blowout, deflation, is going to cause a  
 2 vehicle such as this to become less understeer?  
 3 A. Less understeer?  
 4 Q. Less understeer.  
 5 MR. KAPP: Can you read the question back  
 6 again?  
 7 (The question was read.)  
 8 A. No.  
 9 Q. (By Mr. Brosseau) Would you agree that a  
 10 front tire steer axle failure such as you have here will  
 11 cause this vehicle to become more understeer?  
 12 A. No.  
 13 Q. Are you aware of any literature that  
 14 addresses that issue?  
 15 A. No.  
 16 Q. Are you aware of any literature that talks  
 17 about what happens when you have a tire disablement such  
 18 as a tread separation or a blowout on a vehicle in terms  
 19 of the effect on steer grading?  
 20 A. I don't think so, no. There probably is,  
 21 but I'm not aware of any.  
 22 Q. Do you know who Mark Arndt is?  
 23 A. Yes. Here's what we look at, the dynamics  
 24 of this vehicle. And when we look at the dynamics of  
 25 this vehicle and we look in particular with what's

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1 occurring here, the failure of a steer axle means that  
 2 I've lost my ability to steer with the tire that has  
 3 failed. And if I lose my ability to steer with the tire  
 4 that has failed, I have, in effect, reduced my slip  
 5 angle.  
 6 If I reduce my net slip angle between  
 7 those in the front, the rear remains the same. That  
 8 creates less understeer. And to the degree of the weight  
 9 or the mass that's on each of these vehicles and how it's  
 10 distributed can result in a condition of oversteer.  
 11 MR. KAPP: Just for the record, when he  
 12 was talking about -- he was talking about an exhibit, and  
 13 that's 261.  
 14 THE DEPONENT: That's correct.  
 15 Q. (By Mr. Brosseau) Would you agree that if  
 16 you put a vehicle onto a circle and you increase its  
 17 speed around the circle, there are three options and only  
 18 three options that are going to occur, assuming it  
 19 doesn't crash into something? One is it's going to spin  
 20 out, and the other is it will go into the circle or it  
 21 will reach its maximum velocity?  
 22 A. Certainly.  
 23 Q. Spin out, plow in, or reach terminal  
 24 velocity?  
 25 A. Certainly.

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1 Q. And a vehicle which is understeer will  
 2 require more steer to keep the circle?  
 3 A. That's correct.  
 4 Q. Less steer if it's oversteer to keep the  
 5 circle?  
 6 A. If we're talking about dual steer, not  
 7 quadsteer.  
 8 Q. Correct. We're talking dual steer here,  
 9 correct?  
 10 A. Correct.  
 11 Q. I'm talking about a vehicle such as this.  
 12 And terminal velocity means you just can't  
 13 go any faster, correct?  
 14 A. You can go -- terminal velocity means  
 15 that's at the point where I go into yaw. Typically, they  
 16 will talk about critical speed of the vehicle. So if I'm  
 17 turning at its critical velocity for that curve, then I'm  
 18 at the maximum capable ability of that vehicle to  
 19 maintain that particular radius at that particular speed.  
 20 If I increase my speed with the same steer  
 21 angle, I will go outside. If I decrease my speed with  
 22 the same steer angle, I'll go inside.  
 23 MR. KAPP: What do you guys want to do  
 24 about lunch?  
 25 MR. BROSSEAU: Let's go off the record.

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1 (Recess from 12:04 p.m. to 1:10 p.m.)  
 2 Q. (By Mr. Brosseau) We started through some  
 3 photographs, prints of photographs that you brought with  
 4 you. And we've talked about 263 and 264. And there were  
 5 some others that you pulled out thinking that apparently  
 6 they might be worth demonstrating some opinions or bases  
 7 for those. You have that collection in front of you.  
 8 Do you want to just take us through those?  
 9 A. Yes.  
 10 Q. Please do. I'll tell you what, before we  
 11 get through them, let's just mark them.  
 12 (Exhibits 265 through 278 marked.)  
 13 Q. Dr. Ogden, we have now had marked copies  
 14 of photographs that you brought with you, and we've  
 15 marked those 265 through 278. And you're going to go  
 16 ahead and tell us what you found significant as it  
 17 relates to your opinions and your work that led you to  
 18 bring these with you?  
 19 A. Yes. In particular, when we're looking at  
 20 265, it is showing the curvature. This is just beyond  
 21 Point B that we identified in 264. Actually, Point B is  
 22 right on the left-hand side that you see the dash mark,  
 23 and there's a tar mark. That's about where Point B was.  
 24 Q. Could you use your blue Sharpie and mark  
 25 where that is, please?

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1 A. I can.  
 2 **Q. Thank you.**  
 3 A. I put approximate B, because that's -- if  
 4 we look at 264, you can see the tar mark just above where  
 5 Point B intersects. That's actually what we see here.  
 6 So this is right where we start to see the curvature.  
 7 And you can see where the tire is starting to  
 8 leave -- this is the right front steer tire leaving just  
 9 marks on the outside edge of it.  
 10 And the outside edge is leaving these  
 11 marks just past Point B, and then the curvature  
 12 continues, and then we see the caster imbalance  
 13 occurring. You can actually see some of that caster  
 14 imbalance past that line of approximate B further towards  
 15 the right-hand side where the tire mark is already  
 16 starting to oscillate.  
 17 Oscillation is not going to be instant at  
 18 the same frequency. It's going to develop into it and  
 19 become more significant until the oscillation reaches its  
 20 maximum point. And so we can see where that is  
 21 occurring.  
 22 **Q. When you say "maximum point," are you**  
 23 **talking about in terms of deviation or frequency or both?**  
 24 A. Both.  
 25 **Q. Please continue.**

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1 A. Yes. That's what we see on 265.  
 2 **Q. Okay.**  
 3 A. 266 is showing us the median crossing, and  
 4 this is from the eastbound traffic lanes looking towards  
 5 the median. And now we can start to see dirt that is  
 6 displaced into the westbound lanes. Part of that is due  
 7 to the fact that we have one in the trailer -- the rear  
 8 trailer on the FedEx double --  
 9 **Q. Into the east --**  
 10 A. Median. Into the east boundary lanes.  
 11 **Q. I think you said westbound. You mean**  
 12 **eastbound.**  
 13 A. Okay. I believe I said eastbound. But if  
 14 I said westbound, I do mean eastbound.  
 15 **Q. Go ahead.**  
 16 A. And I'm looking towards the east here in  
 17 this particular photograph. And I can see the crossing.  
 18 And you can also see where the front tires are coming  
 19 across the median that we have the front wheel and the  
 20 front tire, and then you can see on the right side it  
 21 becomes thicker. That would be indicative of braking.  
 22 **Q. Is that just on the right side that's**  
 23 **thicker?**  
 24 A. The right side is the only one that's  
 25 going to do that. The left side is going to stay

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1 constant because it doesn't have a tire on it.  
 2 **Q. The right side is also going to tend to be**  
 3 **a heavier mark because that's the side that's more**  
 4 **loaded, correct?**  
 5 A. The left side?  
 6 **Q. The right side.**  
 7 A. Oh, the right side, yes. But the right  
 8 side also has a tire on it. And it is loaded on that  
 9 right side because weight transfer or the shift will go  
 10 to that outside. We also see two large sections of the  
 11 tire tread.  
 12 **Q. Actually, could you, so we have that**  
 13 **preserved, just circle --**  
 14 A. I actually in the next one --  
 15 **Q. Thank you.**  
 16 A. -- identify -- what I do first --  
 17 **Q. Next is 267?**  
 18 A. That's correct. 266 and 267 are coupled,  
 19 meaning they are the same photo. And then the evidence  
 20 I'm showing you is -- first, I'm showing you the blank  
 21 photo, and then I'm showing you the evidence.  
 22 **Q. See, you know exactly how I take a**  
 23 **deposition.**  
 24 A. This is how I like to do my depositions,  
 25 too, so . . .

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1 MR. KAPP: Well, I'm glad you guys are  
 2 having fun. At the end you can do pinky shakes and sing  
 3 Kumbaya and all that. That's good.  
 4 THE DEPONENT: That was tongue and cheek,  
 5 by the way.  
 6 MR. KAPP: Not from my end.  
 7 A. 268 and 269 are again scene photos that  
 8 are closeups that, again, show those two pieces of the  
 9 tire tread from the left front steer axle tire.  
 10 270 and 271 are pieces of that tread that  
 11 were photographed by a police officer. First one  
 12 identifies a large crescent-shaped piece, and then 270  
 13 zooms in on it.  
 14 **Q. (By Mr. Brosseau) 271 zooms in on it?**  
 15 A. Pardon me. 271 zooms in on it. And my  
 16 understanding is Mr. Scott believes that he sees a nail  
 17 in this tread. And I think that's a bit of a reach to  
 18 say that that's a nail. I see many little pieces in this  
 19 tread, and I see actually a piece of a rock. And that  
 20 could be anything from a rock or a piece of aggregate or  
 21 a piece of metal or a piece of anything.  
 22 And there's no evidence that what is seen  
 23 on here actually penetrates through the tread. It is  
 24 just actually caught in the tread groove. But there's  
 25 another reason why I think it's very clear that this is



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1 not a nail. When a nail is trapped or captured into the  
2 tread and it's being pushed in, it has to have force to  
3 push it in.

4 That force actually comes from the  
5 application of the normal force of the vehicle pressing  
6 down onto the roadway that the mass of it and the normal  
7 force pressing back from the ground that pushes that nail  
8 in.

9 As that tire continues to revolve, it  
10 actually polishes off that object. If that was a nail --  
11 particularly since it's sitting right on the outer edge,  
12 it would be bright and shiny. It is actually, when you  
13 zoom in on it, dark brown.

14 So there's two things. And most likely, I  
15 believe it's not a nail. I also don't think the Wyoming  
16 Highway Patrol would take a picture of this if it was a  
17 nail and not take a picture of the back side if it went  
18 through the tire.

19 Secondly, I also think that if this was a  
20 nail, in fact, because there is no evidence this has  
21 chronically been in a tire, then it could have been  
22 picked up in the median. Medians are full of crap, so --  
23 and that's, unfortunately, what happens when you have a  
24 median on a very busy highway like you have on I-80.

25 **Q. Before you move from there, let me ask,**

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1 **have you read the deposition of William Woehrle?**

2 A. No.

3 **Q. FedEx tire expert?**

4 A. No, I haven't.

5 **Q. Please go ahead.**

6 A. Yes. 272 is just showing you the unit  
7 number of the truck, 125417, so that I can correlate that  
8 with the next photograph which is 273. 273 is the left  
9 front bumper wraparound trim panel on the freightliner,  
10 and it has that same number, 125417.

11 And you can also see rubber transfer marks  
12 that are deposited, interestingly on this case, on top of  
13 and forward of the opening of the wheel well.

14 **Q. Could you circle on 273 those rubber**  
15 **transfer marks you are referring to, please?**

16 A. I sure can.

17 **Q. You've now done so with two circles?**

18 A. I have because there's two spots where we  
19 actually can see rubber transfer that's on there. That  
20 means that the -- as you look at the stripping or  
21 striping of it, that means that the tread has separated  
22 at this point. And there's pieces of it, most likely the  
23 cords, that still have some rubber that are extended out;  
24 cords that we can see, potentially portions of the tire  
25 that is contained in 278 which actually sat next to it.

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1 We see those strips.

2 **Q. Is 278 a different piece of tread?**

3 A. 278 is different than 270 and 271.

4 **Q. How do you determine that one tread piece**  
5 **versus the other tread piece probably did that?**

6 A. Well, this tread piece, 278, was found  
7 right next to the front portion of that bumper wraparound  
8 making it the likely culprit but doesn't make it the only  
9 culprit. There could be several pieces of it that are  
10 actually sticking out that could have hit this portion.

11 **Q. When you say "found," you mean**  
12 **photographed for the first time that we have any**  
13 **evidence, photographed near each other?**

14 A. Well, what I mean found means the  
15 highway -- the Wyoming Highway Patrol located it and  
16 photographed it at that location. That's the evidence we  
17 have.

18 **Q. When you say "located it," what do you**  
19 **mean?**

20 A. It was located and it was also surveyed in  
21 the GPS survey that was completed by the Wyoming Highway  
22 Patrol. Its location is actually in points which I have  
23 in some of my diagrams, all those points. You can  
24 actually see where they surveyed the location of those  
25 elements as well.

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1 **Q. Have you formed the opinion that both that**  
2 **bumper corner that appears prominently in 273 as well as**  
3 **the tread piece in 278, when they came to rest before**  
4 **they were moved or disturbed were located in close**  
5 **proximity to each other?**

6 A. They probably were.

7 **Q. And it's, therefore, your opinion that it**  
8 **is probable that the tread piece in -- well, not certain,**  
9 **but probable that the tread piece in 278 is the piece**  
10 **that's responsible for the rubber transfer marks that you**  
11 **see on the bumper piece in 273?**

12 A. It could be, yes. I think it's probable  
13 that it is one of the pieces or -- or if multiple had  
14 struck it. I can't tell you that multiple pieces didn't  
15 strike it.

16 **Q. Let me go back to the beginning of the**  
17 **question.**

18 **Are you able to state an opinion to a**  
19 **probability whether the tread piece shown in 278 is the**  
20 **tread piece that made any of the marks on the bumper**  
21 **piece that's shown on 273?**

22 A. I think it's probable.

23 **Q. Thank you.**

24 A. Yes.

25 **Q. Continue then. Is that the end of the**

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1 photos?

2 A. No. There's more photos.

3 Q. Okay.

4 A. The photographs also show and identify the  
5 bumper piece as it was originally laying. It was  
6 actually laying with its face up, the numbers up. And  
7 then it was turned for the photographs that we see here.

8 277 is the original photograph that shows  
9 the location of where they were photographed and  
10 documented in the scene survey.

11 Q. "They" meaning the tread piece that we  
12 talked about in 278 and the bumper piece in 273?

13 A. Yeah. My apologies. That's correct. I  
14 should have been more articulate with that.

15 272 is the inside view of the bumper  
16 wraparound where it is adjacent to the front edge of the  
17 left front wheel well where it connects there. You can  
18 see rubber transfer on the inside in this particular  
19 photo. You can see some marks that are towards the  
20 right-hand side as well as prominently along the top  
21 which is associated with the marks that we see in 273  
22 along the back top edge and the face of that bumper  
23 corner near the wheel well flare.

24 Q. Is it your testimony that the marks we see  
25 in 275 are essentially the same as we see in 273, but

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1 more on the inside rather than the outside of that same  
2 piece?

3 A. That is correct.

4 Q. Okay. Please continue.

5 A. 276 shows the leading edge, meaning the  
6 edge closest to where it connects to the front bumper,  
7 meaning further to the front of the vehicle. And this  
8 photograph shows the inside view. And we can actually  
9 see clear up towards the front, again, those same rubber  
10 transfer marks consistent with what we see on the other  
11 portions of that bumper wraparound paneling.

12 And this evidence, in my opinion,  
13 demonstrates that at least one piece of the tire, as it  
14 separated, was quite lengthy, long enough that not only  
15 could it reach all the way towards the front corner to  
16 strike and create these marks, but what would be well in  
17 length long enough to also strike this steering column.

18 MR. KAPP: Steering what?

19 THE DEPONENT: Steering column.

20 MR. KAPP: Okay. Is that the same as a  
21 shaft?

22 THE DEPONENT: Yes.

23 MR. KAPP: Okay.

24 THE DEPONENT: But when I say "column," we  
25 usually combine the shaft, the universal joint, together.

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1 Q. (By Mr. Brosseau) Does that cover all  
2 the -- that group of photographs?

3 A. It does.

4 Q. Let me ask you to hold onto those that you  
5 last talked about involving that bumper piece.

6 A. Yes.

7 Q. Do you call it a fender, call it a bumper,  
8 or what do you call it? What's your preferred --

9 A. Bumper wraparound.

10 Q. Bumper wraparound. That bumper  
11 wraparound, before it was detached, attached to the rest  
12 of the bumper on the -- essentially the left front corner  
13 of the tractor?

14 A. That's correct.

15 Q. If you were to line up that bumper piece  
16 with the left front corner before deformation, where  
17 would those rubber transfer marks be with respect to the  
18 longitudinal center line of the left steer axle tire?

19 A. They would be in two locations. Some  
20 would be into the inside closer to where that bumper --  
21 the end of the bumper is and the attachment is. That's  
22 what we see on the inside demonstrated by Photograph 276  
23 and then the marks on 275 and 273 would be to the  
24 outside, meaning that this is most likely oscillating  
25 inside and outside as it's detaching.

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1 Q. How far inboard are the most inboard marks  
2 on that bumper wraparound piece with respect to the  
3 center line of the left steer axle tire?

4 A. The bumper wraparound piece adjoins with  
5 the front bumper relatively close to that left front  
6 frame rail.

7 Q. Can you quantify the distance between the  
8 inner most rubber transfer mark on that wraparound bumper  
9 piece and the longitudinal center line of the steer axle  
10 tire?

11 A. No.

12 Q. Have you done anything with any exemplar  
13 vehicle in this case?

14 A. No.

15 Q. Have you done anything to determine what  
16 the precrash distance was between the left steer axle  
17 tire and the closest portion of the steering gear?

18 A. Can you repeat that, please?

19 Q. Sure. Have you done anything to determine  
20 the distance between any portion of the left steer axle  
21 tire and the steering gear of this vehicle before any  
22 deformation occurred?

23 A. In general, yes.

24 Q. How much is the dimension? What's the  
25 difference?

1 A. I don't have the dimensions. I can tell  
2 you that it sets forward of the left front wheel but  
3 adjacent to it to the inside. And, remember, our wheel  
4 is turned to the left. So as this is whipping around,  
5 it's doing one of these numbers, meaning that it is  
6 moving more in an ellipse that is not only straight but  
7 is also straight, meaning in line with the tire but is  
8 also describing a horizontally canted position with  
9 respect to the forward direction of the vehicle because  
10 that wheel is turned to the left.

11 And as the wheel continues, the tire --  
12 the wheel continues to move, but the tire independently,  
13 that's going to change directions constantly, because  
14 that tire has no way to maintain a steady forward track.

15 **Q. Does that tire ever turn straight ahead or**  
16 **to the right at any point in this accident sequence?**

17 A. I would imagine that it turns in all  
18 directions during this accident sequence. The tire  
19 itself deflated.

20 **Q. Does it ever turn to the right from -- or**  
21 **at any time when the tire is -- the left front -- the**  
22 **left steer axle tire is in the westbound lanes?**

23 A. I'm sorry. I don't understand the  
24 question. Maybe repeat it.

25 **Q. I'll explain. We know that this accident**

1 **sequence, as you've reconstructed it, starts in the**  
2 **westbound travel lanes?**

3 A. Yes.

4 **Q. And, in fact, the tractor is in the**  
5 **outside or right of the two lanes?**

6 A. Correct.

7 **Q. It is in the right of those two lanes when**  
8 **it first leaves some sort of evidence of a tire failure?**

9 A. Yes.

10 **Q. At some point, as soon as that occurs, you**  
11 **are seeing that tire turning to the left; is that right?**  
12 **Is that correct?**

13 A. You say "that tire." Which tire?

14 **Q. Left steer axle.**

15 A. The wheel is, certainly. The tire will  
16 follow the wheel, but the tire is not integral with the  
17 wheel anymore. So the tire can be going in any  
18 direction. So at any time that we see it with the marks  
19 that we see, that tire is not integral with the wheel.  
20 So because the wheel is going to the left does not  
21 necessarily mean the tire is as well, because it's no  
22 longer beaded. So it can be rolling and doing different  
23 things.

24 **Q. Let's take it step by step then. Does the**  
25 **left steer axle wheel ever turn to the right while the**

1 **vehicle is in the westbound lanes?**

2 A. No.

3 **Q. Is there evidence that you have that the**  
4 **tire carcass -- I'm distinguishing it from any flailing**  
5 **tread or loose tread pieces -- became outboard of either**  
6 **the inside or outside flange of the left steer axle**  
7 **wheel?**

8 A. Yes.

9 **Q. What is your evidence?**

10 A. We have it at rest that way. It's  
11 actually inside.

12 **Q. Do you have any -- how does that tie to**  
13 **evidence that it was outboard of the inside or outside**  
14 **flanges of the wheel while the vehicle was in the**  
15 **westbound lanes?**

16 A. I can't tell you it wasn't.

17 **Q. Do you have any evidence that the tire**  
18 **carcass, leaving aside any loose pieces or flailing tread**  
19 **while the vehicle was in the westbound lanes, ever got**  
20 **outside the inside or outside flanges of the left steer**  
21 **axle wheel?**

22 A. All I can tell you is there's no evidence  
23 to tell us either way that at any particular time that it  
24 did or did not.

25 **Q. So we don't know whether the tire got**

1 **outside the flanges while the vehicle is in the westbound**  
2 **lane; it might have or it might not have?**

3 A. That's correct.

4 **Q. We know the wheel never turned to the**  
5 **right --**

6 A. That's correct.

7 **Q. -- while the vehicle was in the westbound**  
8 **lanes?**

9 A. That's correct.

10 **Q. Did the wheel ever turn to the right**  
11 **during this accident sequence?**

12 A. I think I answered that. You mean the  
13 whole entire axle sequence?

14 **Q. Yes. From the time this accident starts**  
15 **until the vehicle comes to rest, is the left steer axle**  
16 **wheel ever turned to the right of straight ahead?**

17 A. I think so, yes.

18 **Q. And what point does it first turn to the**  
19 **right?**

20 A. After it impacts the cable median barrier,  
21 and then that redirects the front axle towards the right.

22 **Q. If the steering knuckle spline -- and that**  
23 **is your term for the component of the fracture?**

24 A. It's the input shaft. We're calling it  
25 the spline itself, yes.

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1 **Q. When you say "we're," you're calling it**  
 2 **the spline?**

3 A. That's correct.

4 **Q. It also often is called the input shaft of**  
 5 **the steering gear?**

6 A. Yeah.

7 **Q. But if we say "spline," are we talking**  
 8 **common language?**

9 A. We are, and you can use either you like.

10 **Q. Once the spline fractures and the driver**  
 11 **tries to turn the steering wheel, what happens?**

12 A. He has no input into the front wheels.

13 **Q. What happens when he tries to turn the**  
 14 **steering wheel?**

15 A. It depends.

16 **Q. On what?**

17 A. Depends on what happens to the universal  
 18 joint between the time that it fractures and the time he  
 19 attempts to put steering input into it.

20 **Q. If the driver -- after that fracture**  
 21 **occurs, regardless of when it -- after it occurs and the**  
 22 **driver tries to steer by turning the steering wheel to**  
 23 **the right, what kind of resistance will he have to that**  
 24 **steering wheel turning?**

25 A. Depends.

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1 **Q. On the same thing, on the --**

2 A. Yes. It depends on where that knuckle --  
 3 the whole system, meaning the universal joint, the  
 4 remaining portion of the spline connected into the  
 5 steering shaft goes. There's many places it can go. It  
 6 can go to the left and be free. And then the wheel would  
 7 simply spin. But it could bounce to the right and not be  
 8 free and be restricted up against the engine block or  
 9 some other component to where no matter what you do, it  
 10 won't turn because it's locked by impingement, if you  
 11 will.

12 **Q. Is there any evidence that there was any**  
 13 **impingement?**

14 A. Yes, I think so.

15 **Q. Show me.**

16 A. Yes. My blue folder. This, again, is  
 17 where Mr. Scott and I disagree. Mr. Scott identifies  
 18 some marks that he believes are produced by impact. It  
 19 could have impact with either the Chevrolet or the  
 20 Chrysler minivan. But this is good evidence of  
 21 impingement as well. We can see right along the outer  
 22 edge of the lower portion of the universal joint there's  
 23 a piece of material that looks like that universal joint  
 24 was wedged into something. You can actually see where  
 25 it's scraped off a portion of it and then scraped on the

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1 lower part.

2 That could be just as consistent as  
 3 wedging into something. And then when the impact occurs,  
 4 it dislodges it, because now we're bending the frame,  
 5 moving the engine block back, and that baby can pop out  
 6 just as easy.

7 This mark here would be consistent. I  
 8 can't tell you that it was, but it would be consistent  
 9 with that. And do you want to mark that?

10 **Q. Yes, please. And I'd like to have you**  
 11 **circle that edge, that U joint, that you're showing us if**  
 12 **that's a fair way to characterize it.**

13 (Exhibit 279 marked.)

14 **Q. Have you now circled that on 279?**

15 A. I have.

16 **Q. Do you have any shots of any photographs**  
 17 **that shows anything further that would relate to**  
 18 **evidencing whether this got locked up?**

19 MR. KAPP: What was the question?

20 (The question was read.)

21 A. I don't have anything additional.

22 **Q. (By Mr. Brosseau) Is this your only**  
 23 **physical evidence that there may be some impingement?**

24 A. Yes.

25 **Q. And if it were impinged, could you**

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1 **quantify what kind of force it would be resisting, the**  
 2 **amount of force that this would resist that would be**  
 3 **directed down the steering column to this U joint?**

4 A. Now it's a one-to-one ratio because the  
 5 amount I can steer is the amount I can turn that. And  
 6 the driver -- once he turns the wheel, if it's locked and  
 7 it doesn't move, then the wheel doesn't move, unless he  
 8 has the power to be able to either defeat the area where  
 9 that impingement has occurred or break the U joint  
 10 which -- I highly doubt he has the ability to break that  
 11 U joint. But that's what you're facing.

12 And so if it's locked in and that is  
 13 pinned in there, that wheel won't turn.

14 **Q. And what is -- can you quantify the force**  
 15 **either in shear or torque -- torsional force that would**  
 16 **be necessary to fracture the spline?**

17 A. No.

18 **Q. Can you estimate it at all?**

19 A. No.

20 **Q. Have you attempted to determine the amount**  
 21 **of force that the maximum force that could be transmitted**  
 22 **to this spline by a tread separating from this tire?**

23 A. No.

24 **Q. Why?**

25 A. It's not my issue.



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**1 Q. Is it, as you see it, your issue to**  
**2 determine what caused this fracture?**

**3 A.** I believe I have. I don't think I need to  
**4** quantify the forces and I don't think it's necessary  
**5** because I think it's self-evident the failure occurred.

**6 Q. The failure being the fractured spline?**

**7 A.** That's correct.

**8 Q. Whether it occurred in the crash or**  
**9 occurred from the tread is something you knew was an**  
**10 issue, correct?**

**11 A.** No. Actually, when I first did this  
**12** collision analysis, I had no idea what the issue was. I  
**13** just gathered the evidence. But I could see that we had  
**14** an issue as far as the tire marks and the nature of those  
**15** tire marks because those tire marks are not trouncing and  
**16** they are not -- we are not having a weight shift that is  
**17** creating these marks. We have the wheels swinging back  
**18** and forth.

**19** We can clearly see it in the scrub pattern  
**20** of each of those wheels. That is very unusual. I have  
**21** done thousands of reconstructions, and I can honestly  
**22** tell you this is the first time I have ever seen this  
**23** type of condition with a heavy vehicle collision. I've  
**24** never --

**25 Q. You're talking about this caster**

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**1 imbalance?**

**2 A.** That's correct, the caster imbalance.

**3 Q. And is it also correct you've never seen**  
**4 it reported in the literature?**

**5 A.** I don't know whether the literature would  
**6** address it or not. I could care less whether literature  
**7** addresses it. It's purely an engineering issue. If  
**8** you're an engineer and you have the knowledge, you can  
**9** figure --

**10 Q. Whether the literature addresses it or**  
**11 whether you've seen it before, you know that's what**  
**12 happened here?**

**13 A.** In my opinion, that's what it is, yes.

**14 Q. And as part of this analysis, it didn't**  
**15 occur to you that there would be a question about whether**  
**16 there was adequate force from the tread to fracture; is**  
**17 that true?**

**18 A.** I am not at all surprised that tread  
**19** striking this would cause that. I've seen it --  
**20** actually, if you look at your -- either your Ackermann  
**21** arm in the back that ties into your tie rod which is  
**22** cast -- I've seen those distorted by wheels that have  
**23** hit -- or by tire components that have hit them.

**24** If you look at your steering arm where  
**25** that whole length -- the drag length comes in to the

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**1** wheel, I've seen those bent by that as well. Those are  
**2** much, much more significant than the spline.

**3 Q. I appreciate the testimony, but I'm**

**4 asking, is it correct you've never considered whether it**  
**5 might be an issue as to whether this tread was capable of**  
**6 fracturing that spline?**

**7 A.** No, I don't think it's an issue. I think  
**8** it is capable of it.

**9 Q. Have you read the deposition testimony of**  
**10 Lew Grill?**

**11 A.** I have.

**12 Q. Did you see his testimony that this is**  
**13 like a cupcake striking a helmet of an NFL player?**

**14 A.** I think that is a Lew Grill-ism.

**15 Q. Did you see that testimony?**

**16 A.** I did.

**17 Q. Have you done anything to evaluate that**  
**18 testimony?**

**19 A.** I have no cupcakes or NFL helmets to  
**20** evaluate that. I think it's from an individual who has  
**21** no engineering background, no material science  
**22** background, no accident reconstruction background, a  
**23** sophomoric statement.

**24 Q. You had in your blue folder some**  
**25 additional photographs. And by a quick glance at them,**

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**1 it looked like they tended to deal with the steering**  
**2 system components.**

**3 A.** Yes.

**4 Q. Is it correct you brought those so you**  
**5 could explain to us what you find significant in the**  
**6 damage to that steering system as it relates to the cause**  
**7 of this accident?**

**8 A.** That's correct.

**9 Q. And please do that.**

**10** MR. BROSSEAU: Let's go off the record.

**11** (Recess from 1:47 p.m. to 1:50 p.m.)

**12 Q. (By Mr. Brosseau) We're now looking at**  
**13 prints of photographs taken by you or your office of the**  
**14 steering gear -- or -- steering components in the FedEx**  
**15 tractor?**

**16 A.** Yes. These were taken by me, actually.

**17 Q. Okay.**

**18 A.** These photographs.

**19 Q. If we're going to talk about them, we**  
**20 probably ought to mark them. How many do we have, about?**

**21 A.** Well, let's --

**22 Q. Or do you want to talk just first and then**  
**23 we can figure out if we want to mark them?**

**24 A.** Yes.

**25 Q. Let's do that.**

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1 A. We're going to talk first from the  
2 photograph itself. We can see that there is the ductile  
3 portion --

4 **Q. Let me stop you. Let me mark it.**

5 A. We're going to have two of them.  
6 (Exhibits 280 and 281 marked.)

7 **Q. We now have marked 280 and 281 as a**  
8 **coupled set of photos. Can you tell us what is**  
9 **significant in those?**

10 A. 280 is just my photograph of the U joint  
11 in the input spline that fractured. And I'm showing  
12 directions of force and also evidence of the torsion  
13 that's occurring. Within the upper photograph, you can  
14 actually see marks, very clear, in fact, a little bit.  
15 And then you can also see marks that are coming in at a  
16 different direction.

17 These marks are showing that not only do  
18 we have the shear which is coming in to produce what we  
19 call the ductile fracture face -- that's where when it's  
20 hit, it's deforming. Sometimes -- like, when you pull  
21 taffy, it's ductile and it thins out and then, boom, it  
22 breaks.

23 And then on the back, we can see that  
24 brittle portion. That's that stippling, that rough --  
25 almost looks like concrete. This portion of the fracture

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1 here is any elastic basically. It has no elastic  
2 properties. The first portion has some elastic  
3 properties.

4 The force direction for the shear is  
5 coming in to the face of the fracture for shear. The  
6 torsion removes the chemical bonding between materials;  
7 and, boom, you have the separation.

8 The central portion is a torsion bar that  
9 is used to regulate the fluid flow of the power steering.  
10 That torsion bar is actually fixed with a pin inside of  
11 the upper portion of that input shaft spline that goes  
12 into the U joint, and it's also pinned down into the  
13 lower portion.

14 And so as you're twisting and you're  
15 turning the vehicle, that spline -- one is stationary.  
16 That's the one that's inside, and the one on the outside  
17 turns or twists that little bar, that torsion bar.  
18 Torsion means a twist about longitudinal access of  
19 something.

20 So in this case, just like I'm  
21 demonstrating with this pen, I put a torsion to it. It  
22 twists and then it has elastic properties that behaves  
23 like a torsion spring so that it will restore back to its  
24 normal position when you're facing the wheels forward,  
25 and then it will twist in the opposite direction when we

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1 turn in the opposite direction. That opens up and closes  
2 that fluid assist valve that's coming into the steering  
3 box.

4 Here's an important factor. That bar is  
5 in torsion. So in reality, the position of that bent bar  
6 does not necessarily -- it can, but does not necessarily  
7 tell us where it was positioned when the crash occurred  
8 because it can be twisted completely different.

9 And so the fact that it happens to be  
10 sitting adjacent to the location where we see the shear  
11 and the actual fracture face, if we will, of the initial  
12 portion of that force input may be coincidental, because  
13 it is a torsion bar. It could have been facing in any  
14 other direction and twisted back as soon as it failed.

15 **Q. Or it could be impinged in its current**  
16 **location?**

17 A. It could be. I don't think it is, though,  
18 because I remember when I picked it up, it moved. And so  
19 here's one element we have to look at. We have to look  
20 at the directions of applied forces. In order to apply  
21 shear in one direction, you have to have force applied.  
22 And when you have it stationary, there's an equal -- an  
23 opposite force that must occur, in other words --

24 **Q. I've heard that.**

25 A. Yeah. It's interesting how that occurs.

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1 So for a Newton's third law application into this, it  
2 produces shear. And it may very well be that the bending  
3 of that torsion bar is because as the shear is produced  
4 and that force is pushing it, it is actually bending the  
5 bar in one direction and the opposite direction, if we  
6 will, kind of like a shaped S.

7 **Q. Where is the -- if we look at Exhibit**  
8 **281 -- and by the way, just so we're clear -- you may**  
9 **have said it. 280 and 281 are identical except for the**  
10 **arrows and the labeling that you placed onto 281?**

11 A. Correct.

12 **Q. Where, with respect to what we're looking**  
13 **at in 281, is the front of the vehicle?**

14 A. I have no idea. There's no way to tell  
15 that.

16 **Q. So are you able to tell the direction from**  
17 **which the shear force is coming?**

18 A. There's really no way to do that.

19 **Q. Okay. And when we talked earlier, you**  
20 **talked about torsional force and shear force. Is it a**  
21 **combination of those forces or is it just one which**  
22 **produces the fracture of the spline?**

23 A. It's the combination of the two. It's a  
24 Mode 3 fracture.

25 **Q. And when you say it's a combination, does**

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1 that mean -- let me back off that and put it this way:

2 Is it correct, in your opinion, torsional force alone is  
3 inadequate to produce the fracture of the spline?

4 A. Well, in general, that's not true.

5 Q. In this case?

6 A. In this case, it probably is true, yes.

7 Q. And so a shear force is necessary to  
8 produce this fracture in this case?

9 A. That's correct.

10 Q. And other than to show the shear forces  
11 you have with the arrow here, are you able to tell us  
12 anything further about where that force is coming from?

13 A. Yes.

14 Q. Tell us.

15 A. Okay. Let me show you with regards to  
16 Mr. Scott's statement regarding this. And I believe you  
17 have some additional ones over here.

18 Q. I have several additional.

19 A. All right. Here we go. Mr. Scott would  
20 like us to believe that the impact produced by the  
21 collision either with the Chevrolet Venture or the  
22 Chrysler is the element that is producing the failure of  
23 that steering input spline, that shaft. The reason why I  
24 use spline is because typically when they're toothed to  
25 set in and engage, that is a spline. It's a shaft.

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1 Doesn't matter. That's a side note.

2 So when we're looking at how that is  
3 functioning in this particular case, we have to look at a  
4 couple of different things.

5 Q. When we look at those couple of different  
6 things, would it be helpful to refer to a photograph?

7 A. Yes, it would.

8 Q. Let's mark those two photographs if we  
9 might.

10 (Exhibits 282 and 283 marked.)

11 Q. Let me hand you Exhibits 282 and 283,  
12 Doctor. Tell us what those photos tell us.

13 A. 282 and 283 are photographs that I took  
14 that shows the universal joint that is at the end of the  
15 steering shaft. And I have it set on -- I believe that's  
16 the left front frame member so that we can kind of get a  
17 look at it. There's an impact mark that Mr. Scott has  
18 identified and believes is the element that produced the  
19 force that resulted in the fracture of the spline or that  
20 steering input shaft.

21 Now, if we look carefully, there's a  
22 couple of identifying features we want to see. First of  
23 all, on the bottom portion of the universal joint, the  
24 portion that's closest to where it conjoins with the top  
25 of the steering gear box, we can see there's a nut that's

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1 on the side where the scraping deformation is present on  
2 the bottom portion of that universal joint.

3 On the opposite end is the bolt head.

4 This becomes important when we look at a view of that  
5 same portion of the steering U joint when it is now set  
6 on the side to where we can see the fracture face, which  
7 is an additional set of photographs I have present.

8 Q. Would it be helpful if we mark these?

9 A. It would, in fact.

10 (Exhibits 284 and 285 marked.)

11 Q. Using Exhibits 284 and 285, can you  
12 explain what you're talking about here?

13 A. Yes. Now, remember we talked about, in  
14 using 282 and 283, that the impact force direction that  
15 would have produced the damage on the upper portion of  
16 the U joint that is suspect to being connected to the  
17 spline is on the nut side of that connector.

18 On the nut side of the connector, which we  
19 see in Photograph 284, it would have applied a force in  
20 the direction that I'm showing in the arrow on 285. This  
21 is the point where the impact occurred and the arrow  
22 showing the direction of force applied to that upper  
23 portion. It's actually in the wrong direction to produce  
24 shear that we have on the spline.

25 So that tells us that the shear that was

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1 on the spline was not produced by the mark that is  
2 identified by Mr. Scott. The forces are not in the  
3 proper direction to produce the failure.

4 Q. And are the forces that were necessary to  
5 produce the shear coming in the proper direction from the  
6 tire tread?

7 A. Depending on the orientation of the  
8 universal joint at the time when the impact occurs, yes.  
9 But I can't tell you what that orientation is because  
10 once it comes off, it just spins, and there's no way to  
11 tell what it is.

12 Q. Are you familiar with the terms "lifting"  
13 and "peeling" separations?

14 A. Yes.

15 Q. Is this a peeling or lifting separation?

16 A. I would not qualify this as either a  
17 lifting or peeling separation. I would qualify this as a  
18 shear and torsion.

19 Q. We're talking completely different things.  
20 Let me clarify.

21 A. I think we are.

22 Q. When treads separate -- when treads  
23 separate from tires, are you familiar with the fact that  
24 they often are referred to as either peeling separations  
25 or lifting separations?

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1 A. I have no opinion on tires.

2 **Q. You're not familiar with the -- I'm not**  
**3 talking about the causes, but the mechanism as the tread**  
**4 is coming -- detaching itself from the carcass, how it is**  
**5 flailing other than you're saying it's going to be moving**  
**6 in and moving out as the tire itself is moving**  
**7 directions?**

8 A. I have no opinion on the mechanisms, but  
 9 we can clearly see the results of it which are on the  
 10 left front bumper wraparound as well as identified in my  
 11 inspection in my photos of the rubber transfer that's  
 12 actually on the face of the upper portion of the U joint  
 13 that connects to the steering shaft as well as on the  
 14 steering shaft itself.

15 **Q. As the -- if the tread is a mechanism that**  
**16 produces a fracture of the spline, is it correct that the**  
**17 tread has to reach the spline?**

18 A. No.

19 **Q. What parts could it reach instead of the**  
**20 spline to produce the fracture?**

21 A. The shaft and the U joint. And once  
 22 striking the shaft and the U joint, the shear, meaning  
 23 the motion between the U joint where it connects and  
 24 rotates at the top of the steering gear boxes, that's  
 25 where our shear is being produced. It's not actually a

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1 direct impact into the U joint, but it's the  
 2 differentiation of that motion that's occurring between  
 3 the gear box and the U joint.

4 **Q. In fact, in this case, you see some**  
**5 transfer marks or what you refer to as transfer marks on**  
**6 the shaft itself, correct?**

7 A. On the shaft and U joint, yes.

8 **Q. And to the extent that they're on the U**  
**9 joint, if they are from this tread and are causally**  
**10 related to the spline fracture, then the tread has to**  
**11 reach the U joint to the extent the U joint is involved?**

12 A. That's correct.

13 **Q. And if they're on the shaft, the tread has**  
**14 to reach the shaft?**

15 A. That's correct.

16 **Q. Okay. Is it correct that the U joint is**  
**17 inboard -- we talked about the box overall, but it is**  
**18 inboard of the left steer axle tire in the nondeformed**  
**19 condition, precrash?**

20 A. Yes.

21 **Q. Okay. And I understand you haven't**  
**22 quantified the distance between those two, but it is**  
**23 inboard and it is located slightly below the top of the**  
**24 tire; is that right?**

25 A. It is -- meaning the U joint?

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1 **Q. Yes.**

2 A. It is inboard and approximately adjacent  
 3 to the top --

4 **Q. Okay.**

5 A. -- of the tire, yes.

6 **Q. And the shaft runs essentially up and**  
**7 rearward from the U joint; is that right?**

8 A. Yes, diagonal.

9 **Q. For the tread to make contact in a fashion**  
**10 that would damage -- strike that.**

11 **In order for the tread to reach the**  
**12 steering components, as you have opined, with sufficient**  
**13 force to fracture the spline, does the tread still have**  
**14 to be connected to the carcass?**

15 A. Most likely, yes. I believe it would be.

16 **Q. So if the tread is off by the point that**  
**17 it's making contact with the shaft or the U joint, it**  
**18 probably does not have enough force to, in part, produce**  
**19 the fracture, correct?**

20 A. I don't know.

21 **Q. When you say it probably has to be**  
**22 attached, is not the corollary also true; and that is, if**  
**23 it's not attached, it probably doesn't have enough force?**

24 A. No. It doesn't mean one without the  
 25 other. But we do have evidence it probably was because,

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1 otherwise, we don't have the marks clear up on the upper  
 2 portion near where the front frame rail and the  
 3 wraparound at the bumper connects near the frame rail and  
 4 on the other corner. So it tells it's sufficiently long  
 5 enough to reach there which is quite a distance away. It  
 6 should be sufficiently able to reach up in the area where  
 7 the steering column components are.

8 **Q. Did the tread flap that reached the bumper**  
**9 wraparound piece, was that the same tread piece that made**  
**10 the marks on the steering shaft?**

11 A. I have no idea, but it's probable.

12 **Q. Why is it probable?**

13 A. Because it would be long enough.

14 **Q. Aren't there two pieces long enough out at**  
**15 the scene that you saw that would be long enough?**

16 A. There probably are. But I'm saying that  
 17 it's probable that that one -- and you're assuming again  
 18 that that's only hit once. That could be hit several  
 19 times. And I don't know that it wasn't hit several  
 20 times.

21 **Q. I'm not making that assumption. I'm**  
**22 asking you, you said you need a long enough piece.**  
**23 You've got two pieces that are long enough, don't you?**

24 A. I believe so, yes.

25 **Q. One of which doesn't come off until the**



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1 vehicle is at least in the median, correct?

2 A. That's correct.

3 Q. So that piece couldn't have done it,  
4 right?

5 A. I don't know that it couldn't have done  
6 it.

7 Q. By that point, the fracture has already  
8 occurred, in your opinion, correct?

9 A. It has, but what I'm telling you is that  
10 was at one time attached. So that doesn't mean that that  
11 wasn't the portion that was flailing that hit it. It  
12 becomes detached later, but it doesn't mean that it  
13 wasn't the portion that hit. I can't tell you which  
14 portion --

15 Q. Okay.

16 A. -- or which ones --

17 Q. Okay.

18 A. -- if they're multiple.

19 Q. So the record is clear, in your opinion,  
20 you need a tread piece that's long enough probably to be  
21 attached to the carcass and make contact with the  
22 steering shaft and/or U joint while the tread is still  
23 attached to the carcass probably?

24 A. Probably, yes.

25 Q. And there are at least two pieces that

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1 you've seen that related to the left steer axle tire that  
2 are possible candidates for being long enough to reach  
3 those steering components?

4 A. Did you say at least two?

5 Q. Yes.

6 A. Yes.

7 Q. Okay. There are only two that you know  
8 about, but there could be more?

9 A. There's actually three pieces.

10 Q. That are long enough?

11 A. Well, here's the key. When they're at  
12 rest, we've had a lot go on. But they could have been  
13 attached at different times, and we see them at rest but  
14 we have no idea why they're there.

15 For instance, the piece that is sitting  
16 next to the bumper wraparound could have at the time been  
17 attached to one of the other two pieces. It could have  
18 been its own independent piece. I can't tell you that  
19 because I don't know because I didn't observe it. So  
20 there's the potential of three pieces. And I can't tell  
21 you which one or if all three didn't make contact.

22 Q. When you say you didn't observe it,  
23 there's at least one piece near the bumper wrap that you  
24 did not personally see?

25 A. No. I said I did not observe which one

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1 contact -- meaning I wasn't there present watching the  
2 wheel fail -- or the tire fail and watch it, so I can't  
3 tell you.

4 Q. So we'll eliminate you as a cause of this  
5 accident?

6 A. Yes, I think so.

7 Q. As the tread flap is coming off the tread,  
8 recognizing that you're not prepared to say whether this  
9 was a lifting or a peeling separation, are you able to  
10 say whether the tread that was doing this damage made the  
11 damages the tire was -- as the flap was attached at the  
12 front end of the flap, in other words, in the direction  
13 of the tire as it's rotating coming over the top or, for  
14 example, a piece that is trailing the tire as it's  
15 rotating?

16 A. I think logic prevails it has to be a  
17 trailing piece. A leading piece will be due to -- the  
18 rotation will actually hug closer to the carcass of the  
19 tire, whereas the trailing piece will stay out away from  
20 the tire and rotate and slap forward.

21 Q. Okay. It has to be a --

22 A. A trailing piece, otherwise it doesn't  
23 extend.

24 Q. Have you made any -- let me back up.  
25 You haven't seen a transcript of John

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1 Scott's deposition, correct?

2 A. No.

3 Q. Are you aware from his supplemental report  
4 what he determined was the distance between the center  
5 line and the steer axle tire and the U joint or spline?

6 A. No. I would imagine it's probably 10 to  
7 24 inches.

8 Q. If, indeed, the steering components we  
9 talked about that necessarily would have to be impacted,  
10 that being the U joint and steering shaft, one or the  
11 other or both, are inboard as they are, what is the  
12 mechanism by which the tread as it's rotating around the  
13 tire gets inboard that 18 to 24 inches?

14 A. Well, there's an assumption I think  
15 Mr. Scott is making that he's not thinking about, so that  
16 tire is not facing forward. The wheels are turning to  
17 the left. So that means the back end of that tire, if  
18 it's still trailing at least in the direction of the  
19 wheel, is closer to the frame rail, in fact, very close  
20 to the frame rail. And the outboard portion of that tire  
21 is away from the frame rail because it's turned towards  
22 the left.

23 That means as it rotates, it necessarily  
24 will come very close not only to that steering shaft but  
25 also the universal joint, because we know the wheels are

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1 not straight. And I think the assumption of the straight  
2 line distance and the wheel rolling straight and the  
3 trailing piece following behind, it would trail in a  
4 direction that is not in intercept with the steering  
5 shaft or the U joint.

6 Once you turn that wheel and that tire is  
7 rotating now not forward in line with the direction of  
8 the vehicle's body, but at an angle to it, now it comes  
9 very close to the frame rail and then away from the frame  
10 rail in the front.

11 **Q. Have you made any study, have you done**  
12 **anything to document, and have you made any measurements**  
13 **that would show that the tread piece, even when assuming**  
14 **that the tire is -- assuming the tire is still on the**  
15 **wheel while it's in the westbound lanes, if you take that**  
16 **wheel and you turn it to full stop to the left, whether**  
17 **it will be on a plane that will reach any of these**  
18 **steering components?**

19 A. I don't have to do that study. I think  
20 it's very clear. And the reason for that is when at full  
21 stop to the left, the back edge of that tire is going to  
22 be literally inches away from the inside frame rail  
23 rather than measuring with fractions of feet. That's  
24 because we want a very hard left or right turn and low  
25 speed turning circle so that the way the Ackermann is set

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1 on the inside wheel, the inside wheel will turn much  
2 tighter than the outside wheel. That's the Ackermann  
3 effect; because if we have them both turning at the same,  
4 then we have them working against each other during the  
5 turn. That's why your Ackermann arm is bent as it leads  
6 into the tire rods.

7 So as I turn to the left, the left will be  
8 tighter than the right.

9 **Q. So if we were to take -- and understanding**  
10 **from your testimony, you haven't done it. But if you**  
11 **were to take, say, an exemplar Cascadia substantially**  
12 **similar in design and put the same tire size on and turn**  
13 **this steering wheel as far left as you can turn it and**  
14 **then see what the plane is described by that steer tire**  
15 **at that point, is it your testimony that that plane would**  
16 **intersect either the portion of the shaft or the U joint**  
17 **that has rubber transfer marks?**

18 A. No. The plane won't. The plane will go  
19 underneath and it will intersect underneath.

20 **Q. Longitudinal plane?**

21 A. That's irrelevant. You have a  
22 three-dimensional system.

23 **Q. You tell me X, Y, or Z. Which hits it?**

24 A. Yes.

25 **Q. Which one?**

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1 A. Yes.

2 **Q. Which one?**

3 A. All.

4 **Q. X, Y, and Z all --**

5 A. All. Let me tell you why they do it.

6 Because once you take that piece of the tire out, that  
7 piece of the tire is also elastic. It has properties  
8 that when it's moving, it can move side to side and it  
9 can whip as it comes through. And if I have any angular  
10 rotation due to the fact that tire is no longer perfectly  
11 torous and round -- torous meaning the shape of the tire  
12 as we look at the cross cut section and round as in the  
13 circumference -- then that causes that tire, just as we  
14 see in our physical evidence, to move side to side. And  
15 that side to side is going to cause that piece to also  
16 move side to side.

17 **Q. I don't think you're answering the**  
18 **question that I asked.**

19 A. I think I am.

20 **Q. Let me try again. And that's the plane of**  
21 **the tire, assuming that you turn the wheel to full stop,**  
22 **and you said you want to talk about all the planes, but**  
23 **you're also describing the way it gets in there is**  
24 **dependent, at least, in part of the elasticity of that**  
25 **tread moving outside the plane described.**

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1 A. Not necessarily, but it will.

2 **Q. But isn't what you described as a way to**  
3 **get it outside the plane is the tire because of its**  
4 **elastic properties flailing outside the plane?**

5 A. No. No. First of all, the plane will  
6 intersect. Here's how we look at it.

7 **Q. Intersect what?**

8 A. Let me show you. If I have a plane of a  
9 tire -- my computer is the direction of turn of that  
10 tire.

11 **Q. Okay.**

12 A. And this is the plane. Here's the  
13 steering shaft. That plane intersects.

14 **Q. That's what I'm asking you. You're saying**  
15 **that you don't need to do the analysis; you can see that**  
16 **it does?**

17 A. Yes.

18 **Q. And it's going to intersect at the point**  
19 **where the rubber transfer marks are made?**

20 A. Well, and it has to because it's there and  
21 I see it, so yes.

22 **Q. Assuming that you're correct that's what**  
23 **does this while the tread is still on and long enough to**  
24 **produce the damage?**

25 A. I saw this vehicle within a day and a

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1 half -- or half a day, I should say, less than a day  
 2 after it occurred. I actually physically observed the  
 3 evidence, and I believe that evidence was completely  
 4 missed by the other inspectors, and they never bothered  
 5 to wipe off the dirt that was on those to see if it was  
 6 present. And I think that was an error on their part.  
 7 And this is something that we clearly saw and recorded.

8 **Q. You said that you have some comments or**  
 9 **done some analysis in response to Mr. Scott. We've**  
 10 **talked about some of that, correct?**

11 A. I think we talked about most of it.

12 **Q. Did we talk about all of it?**

13 A. Pretty much the main points I wanted to  
 14 get, I think.

15 **Q. How about any small points? I'd like to**  
 16 **make sure I have a complete collection of all of your**  
 17 **opinions.**

18 A. Well, Mr. Scott has missed the -- he's  
 19 fixated on the fracture of this spline as being produced  
 20 by the impact. He's also fixated on believing that if  
 21 this spline fractures, then it should have damaged the  
 22 power steering reservoir or it should have damaged the --  
 23 all of the components to include, I believe, the fuel  
 24 filter, all those areas. There's a problem with that, is  
 25 that we can clearly see on the bumper wraparound left

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1 front panel that while it was connected to the vehicle,  
 2 it was struck and torn free from its fastening points at  
 3 the left front of the vehicle by a portion of that tire  
 4 as it whipped and hit it.

5 We see the marks actually wrap around the  
 6 back portion and actually strike into the front and the  
 7 interior portion of that panel. Well, if that were the  
 8 case, then just simply that evidence right there shows  
 9 you that you don't have to have damage to any of the  
 10 hoses that are in that location. You don't have to have  
 11 damage to the fuel filter. You don't have to have damage  
 12 to the power steering reservoir, because we know that  
 13 that occurred and we also know that that left front  
 14 bumper corner panel was found closest to the point where  
 15 our marks begin further from the point where it crossed  
 16 the median.

17 So that tells us that it occurred during  
 18 that tire separation. And I think his fixation on that  
 19 has taken him away from realizing that the damage to the  
 20 fuel filter and the damage to the power steering  
 21 reservoir and the damage to all of those components  
 22 adjacent to the engine compartment, the left frame rail  
 23 buckling, the fact that that left front wheel is pulled  
 24 all the way back, those are all impact induced. Those  
 25 are impact induced from striking with the Chevrolet

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1 Venture first and then also the final impact that we see  
 2 with the Chrysler.

3 And they do not have to necessarily occur  
 4 at the same time that the damage and the fracture to the  
 5 universal joint at the steering gear box occurred.

6 **Q. Do you have any further comments on Mr.**  
 7 **Scott's work?**

8 A. I think his determination of speed --  
 9 unless his determination of speed is essentially similar  
 10 to what I've just got done saying, Listen, let's assume  
 11 this is your start speed, then this would be your  
 12 deceleration. I think that that is relatively the same,  
 13 but there's also another caveat we have to look at very  
 14 carefully. Here it is.

15 Impact with Chevrolet will produce a rapid  
 16 deceleration of the vehicle much, much higher than a  
 17 breaking coefficient can generate. I think we would all  
 18 agree with that. Impact with the Chrysler will generate  
 19 a deceleration or a negative acceleration of that vehicle  
 20 much greater than any breaking coefficient can produce.

21 So for averaging all of those deceleration  
 22 values over the full length, we have to look at one thing  
 23 very important. Most of the deceleration occurred at  
 24 those two impacts. So that means the actual true roadway  
 25 and median deceleration rates must be much lower than

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1 what we have for calculating the average.

2 That means if it's much lower, breaking  
 3 cannot occur, not while he's in the westbound lanes and  
 4 not until he enters the center median. And so those are  
 5 key factors. I disagree that any breaking has been  
 6 applied while that freightliner was in the westbound  
 7 lanes, and I think the physical evidence washes that out.

8 **Q. Anything else you disagree with Mr. Scott?**

9 A. There was one other point that I was  
 10 thinking of while I was giving that one.

11 MR. KLINE: Before you do that, can I have  
 12 the first part of that prior answer read back? I could  
 13 not hear when he said what the most --

14 MR. BROSSEAU: We're going to get there,  
 15 if you want.

16 MR. KLINE: Okay. I didn't hear what he  
 17 said the most significant deceleration point was.

18 A. That I can answer, if you want. The most  
 19 significant deceleration occurs --

20 MR. KLINE: If we're going back over this  
 21 ground, then I'll just let the record stand for what it  
 22 is.

23 MR. BROSSEAU: Certainly.

24 **Q. (By Mr. Brosseau) And you said you think**  
 25 **there's one other thing you disagree with Scott on?**

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1 A. Yes. Let me think about it. I think  
 2 primarily I don't think this is a driver error issue.  
 3 This is not a driver error issue. This is an issue of a  
 4 fracture of a mechanical component that directs that  
 5 vehicle that is fracturing at the earliest portions of  
 6 this collision sequence to the point where the driver has  
 7 no steering control. And the lack of steering control  
 8 and the lack of right steer is not due to the lack of  
 9 right steer input.  
 10 But the lack of continuity between the  
 11 steering wheel with the steering shaft with the U joint  
 12 into that input spline through the worm gear and the gear  
 13 box with the power assist into the pitman arm and into  
 14 that drag link, that is pushing that wheel either left or  
 15 right.  
 16 **Q. Anything else?**  
 17 MR. KAPP: Object to form that it's overly  
 18 broad.  
 19 A. I think that Mr. Scott also neglects to  
 20 consider the ECM braking data, which is not associated  
 21 with the same module that's recording the speeds of the  
 22 vehicle.  
 23 **Q. (By Mr. Brosseau) This is the 2.2 seconds**  
 24 **before?**  
 25 A. That's right.

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1 **Q. Okay.**  
 2 A. So the braking -- if the braking was 2.2  
 3 seconds before, the most significant first event that is  
 4 occurring is the impact with the Chevrolet Venture. But  
 5 if we assume that that was insufficient and that it  
 6 wasn't until we had impact with the Chrysler minivan that  
 7 we had the event that would establish our zero and our  
 8 deceleration at the proper rate, then that places braking  
 9 even further into the westbound lanes, meaning the  
 10 driver's attempt to control and this left steer is not as  
 11 Mr. Grill's or anyone else's -- is not induced by  
 12 braking. It's not a braking issue. It is a problem with  
 13 the failure of the steering system.  
 14 And then the driver -- the only other  
 15 option he has remaining is to be able to apply his  
 16 brakes. If we look at perception response times, we were  
 17 assuming the first thing the driver decides to do is  
 18 attempt to steer, but that steering does not function,  
 19 and his next attempt is to brake the vehicle to slow it,  
 20 then it is extremely consistent with not only the ECM  
 21 braking data, but the time distance chart that I showed  
 22 you which means the braking is occurring in the median or  
 23 as he's entering the westbound lanes.  
 24 **Q. Anything else?**  
 25 MR. KAPP: Same objections, to the form

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1 and overly broad.  
 2 A. I knew there was one I wanted to tell you,  
 3 and I can't think of it right now. As we progress into  
 4 the deposition, if I remember that, may I address that?  
 5 **Q. (By Mr. Brosseau) You may. Please do.**  
 6 A. Thank you.  
 7 **Q. Now, you said there were two significant**  
 8 **decelerations?**  
 9 A. Yes.  
 10 **Q. They were the two impacts with the vans?**  
 11 A. Yes.  
 12 **Q. And is it correct you have not attempted**  
 13 **to determine the extent of either deceleration?**  
 14 A. No.  
 15 **Q. That is correct?**  
 16 A. It is correct.  
 17 **Q. So you just know that those are heavy**  
 18 **decelerations. But beyond stating that qualitatively,**  
 19 **you have not calculated it quantitatively; is that true?**  
 20 A. It cannot be done, but, yes.  
 21 **Q. And tell us why it cannot be done.**  
 22 A. Because we do not have adequate stiffness  
 23 data to be able to tell us about that.  
 24 **Q. Are you talking like Neptune stuff?**  
 25 A. No, I'm talking about -- well, yes,

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1 Neptune stuff to a certain degree.  
 2 **Q. What's non-Neptune that you're talking**  
 3 **about?**  
 4 A. I'm talking about my dissertation and a  
 5 group of papers that I wrote regarding what's called the  
 6 G data delta V system of equations.  
 7 It's generalized deformation and total  
 8 velocity change analysis system of equations. This  
 9 allows us to be able to use Newton's third law to be able  
 10 to fill in blanks that we couldn't do before. I went  
 11 through and reformulated the algorithms to include  
 12 vehicle rotation, intervehicular friction, tire ground  
 13 forces. And then when we're impacting, we also look at  
 14 the effects of an offset or oblique impact and those  
 15 rotational forces that are also being contributed into an  
 16 impact event.  
 17 This gives us more of a direct planar  
 18 dynamics view of collisions, much better than we had  
 19 before. And the accuracy is typically between 6 and 8  
 20 percent, and it's better than anything we've had before.  
 21 One thing it allows us to do is if we have  
 22 good reliable stiffness factors for vehicles -- for one  
 23 vehicle but I don't for the other, then I can use a  
 24 Newton's third law relationship between the two and solve  
 25 for the unknown and calculate what I need to find, which



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1 required previously to have stiffness values for both of  
2 those.

3 On the Chevrolet Venture, we not only  
4 struck into the side of the vehicle, but we also struck  
5 an axle. And that is a very different stiffness value  
6 than if I was to generate that from a side impact test,  
7 clearly very different, because axle is a hard zone, but  
8 also I'm striking soft and hard zones in combination. I  
9 have no stiffness factors for the front of the  
10 freightliner. We just don't have them.

11 Now, if I was to impact into the front of  
12 the Chrysler, I could do an analysis except for one  
13 problem. I don't know what damages were initially  
14 present on the vehicle from the impact with the  
15 Chevrolet.

16 If I could quantify that, then I could do  
17 the Chevrolet -- or the Chrysler's impact with the front  
18 of the freightliner and then back that out and know what  
19 the remaining energy of the total amount of damages on  
20 the freightliner which allows me to be able to solve the  
21 equations to figure out what the energy dissipation was  
22 on the Chevrolet. Unfortunately, I can't do that.  
23 There's no way to do that.

24 **Q. So you have not quantified the**  
25 **deceleration of either impact?**

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1 A. I can't.

2 **Q. And you understand Mr. Scott hasn't**  
3 **either, correct?**

4 A. That's correct. In fact, I believe that  
5 he's indicated that that's a missing value that he can't  
6 account for.

7 (Exhibit 286 marked.)

8 **Q. Do you recognize 286 as a scene photo?**

9 A. I do.

10 **Q. Do you know who took it?**

11 A. That is a highway patrol photo, it looks  
12 like, to me.

13 **Q. Do you see a number of tire marks**  
14 **associated with this vehicle in that photograph?**

15 A. That is not a highway patrol photo.  
16 That's my photo.

17 **Q. Do you recognize the number of tire marks**  
18 **associated with this vehicle in that photo?**

19 A. I do.

20 **Q. Are you able to identify which tires made**  
21 **which marks?**

22 A. I think I can.

23 **Q. Please do. And if you can use that same**  
24 **blue Sharpie, I would appreciate it.**

25 MR. BROSSEAU: Off the record.

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1 (Recess from 2:47 p.m. to 2:51 p.m.)  
2 (Exhibit 287 marked.)

3 **Q. (By Mr. Brosseau) Dr. Ogden, did you, per**  
4 **my request, on 286 label various tire marks that show in**  
5 **that exhibit that relate to the subject tractor --**

6 A. Yes.

7 **Q. -- except for the left front?**

8 A. I think you asked me for the -- do you  
9 want me to label all of them?

10 **Q. All of the tire marks that you see from**  
11 **the tractor-trailer combination.**

12 A. Certainly.

13 **Q. Have you now labeled all the tire marks**  
14 **you associated with this tractor-trailer combination that**  
15 **appear in Exhibit 286?**

16 A. Yes.

17 **Q. And ROS means?**

18 A. Right outside. That means you're dealing  
19 with duals.

20 **Q. Then I asked you if you could find for us**  
21 **the document that you said indicates that there was a**  
22 **break event, and you said earlier 2.2 seconds before or**  
23 **from something?**

24 A. It's not 2.2. This is a 1-hertz system.

25 It is 2 seconds.

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1 **Q. So where you said 2.2 before, you're**  
2 **saying 2?**

3 A. That's correct. The 2.2 relates to, I  
4 believe, the ACM data that was related to, I believe, the  
5 Chrysler. And then it led -- there was a total amount of  
6 that braking plus 1.4 seconds of the emergency brake  
7 actuation system that had occurred.

8 So this is two seconds. It's a 1-hertz  
9 system, meaning that it can be anywhere from 2 to 2 and a  
10 half seconds.

11 **Q. And you are looking at the third page of**  
12 **Exhibit 287?**

13 A. Indeed, yes.

14 **Q. And which data are you looking at for this**  
15 **purpose?**

16 A. You look under the brake column.

17 **Q. And down, I assume, that you're going to**  
18 **say to the area where there is seven yeses?**

19 A. That's correct.

20 **Q. Is there any power interruption going on**  
21 **in this period of time?**

22 A. No.

23 **Q. When does the power interruption occur?**

24 A. Most likely with the impact with the  
25 Chrysler.

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1 **Q. Why is this data showing zero as vehicle**  
 2 **speed at the time that the braking was going on?**

3 A. Because vehicle speed is written within  
 4 the -- I believe it's 15 or 16 seconds after the vehicle  
 5 comes to final rest. There's a requirement that after  
 6 the vehicle comes to final rest, it must be stopped  
 7 for -- I believe it's either 15 or 16 seconds, whereas it  
 8 pulls all that speed data off the engine rest. But we  
 9 don't have that communication.

10 So when the vehicle comes to final rest,  
 11 there is no communication so there's no data to pull.

12 **Q. And does that depend on which version of**  
 13 **ECM you're looking at?**

14 A. It does, but for this particular vintage  
 15 DDEC, that's how it records. And I believe it's 15 or 16  
 16 seconds, but I don't recall.

17 **Q. What is your basis for that statement that**  
 18 **that's the time for this particular unit?**

19 A. My memory from my HVEDR course that I  
 20 retook here about a year and a half ago and also from  
 21 that resource -- I could be off by that time period a  
 22 little bit, but I believe that's what it is.

23 **Q. So that means that in the last 15 or 16**  
 24 **seconds this should be showing zeros?**

25 A. No. It simply means that it's gathering

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1 that information and writing it. And after that, it will  
 2 show zeros, yes. When it has come to a stop, if it comes  
 3 to a stop within the time frame after the 000 time.

4 The 000 time is an event time. It is not  
 5 the time when the vehicle stops. It is basically telling  
 6 you that an event occurred that met the criteria for  
 7 recording the information. If it's a last stop record,  
 8 the 000 may be when it comes to a complete stop.

9 **Q. And why is there a 1.0 and a 0.5**  
 10 **sandwiched between a whole bunch of zeros under vehicle**  
 11 **speed?**

12 A. That's probably because of fault code or  
 13 just an anomaly in the system.

14 **Q. Do you know, can you give an explanation**  
 15 **or are you saying those are maybes?**

16 A. Those are maybes. And I think the best  
 17 way is to go, I don't know.

18 **Q. When you say the best way, your best**  
 19 **answer is you don't know why it's showing this?**

20 A. I don't think there's a way to be able to  
 21 tell.

22 **Q. Do you happen to know which version of ECM**  
 23 **this is?**

24 A. I do. It should be on the very first  
 25 page, or you could run the VIN and look, if I don't have

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1 it in here. I would imagine this is a 10, a DDEC 10,  
 2 because of the year and -- oh, here we go. Reports  
 3 configuration page 1 of 1, ECM type, DDEC 10.

4 **Q. Is there an R22 associated with it?**

5 A. Yeah. The ECM S/WR22 or 20008, yes, a  
 6 software version of it.

7 **Q. Are you aware of any published literature**  
 8 **that talks about the necessity for things like an elegant**  
 9 **stop in order to collect this data? Do you know what an**  
 10 **elegant stop is?**

11 A. Maybe you can describe it for me.

12 **Q. Are you aware of any literature talking**  
 13 **about elegant stops?**

14 A. No.

15 **Q. Are you aware of any literature talking**  
 16 **about last stop records? Are you aware of any published**  
 17 **literature on the topic?**

18 A. Not offhand, but I do know that there is  
 19 some and I have reviewed some, but I can't tell you what  
 20 it is.

21 (Exhibit 288 marked.)

22 **Q. I hand you Exhibit 288. Towards the lower**  
 23 **right there is an object that is in the median.**

24 **Do you recognize that?**

25 A. I do.

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1 **Q. What is it?**

2 A. Piece of tire.

3 **Q. Is it one of the pieces of tire that you**  
 4 **previously circled?**

5 A. No.

6 **Q. Could you circle the piece of tire that**  
 7 **you see in Exhibit 288?**

8 A. Sure.

9 **Q. Do you have an opinion as to whether that**  
 10 **piece of tire came from the subject tire?**

11 A. I would imagine it does. I think it's  
 12 probable that it did, but I don't know for sure.

13 **Q. As I understand your testimony, you**  
 14 **believe the probable piece of tread that we saw that was**  
 15 **approximately located to the piece of bumper wraparound**  
 16 **probably came off sometime around the time that the**  
 17 **bumper came off?**

18 A. That's correct.

19 **Q. Other than that, other than that piece, do**  
 20 **you have an opinion as to when any other piece of tire**  
 21 **tread came off this tire?**

22 A. No.

23 **Q. You brought with you -- you said -- to put**  
 24 **it in context, in your report, Exhibit 258, you cited**  
 25 **four reference sources, and you said, There's another one**

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1 I brought with me in addition.

2 A. Correct.

3 Q. And that other one is a paper by Fawzi

4 Bayan, et al.?

5 A. Yes.

6 Q. And that's SAE 2009-01-2918?

7 A. That is correct.

8 Q. Have we now addressed all of the

9 literature that you have cited or referred to for your

10 work in this case?

11 A. Specifically, yes.

12 Q. How about generally?

13 A. No.

14 Q. What other general literature are you

15 relying upon for your work in this case?

16 A. I have an extensive education, training,  
17 and experience over nearly 30 years. And, I mean, I have  
18 textbooks that I have used that I've garnered knowledge  
19 from. I have -- I'm an avid reader of dynamics books,  
20 believe it or not. Somebody may sit down and read a  
21 Clancy novel; I read a book by JD Greenwood on advanced  
22 theoretical dynamics. That's just the kind of guy I am.

23 I have from training courses that I've had  
24 materials that I've reviewed, so that all goes into the  
25 elements that generate that. And so some of those are

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1 tangibles and some of those are intangibles. Does that  
2 make sense?

3 Q. Did you refer to any publication  
4 specifically in your work in this case?

5 A. Yes.

6 Q. Other than the five we've now talked  
7 about?

8 A. No.

9 Q. You also produced a number of binders that  
10 comprise some of your file materials. I want to identify  
11 what you do have in your file. And I'm not sure the best  
12 way to inventory it. But we were -- we earlier took a  
13 look at a flash drive that was produced at the time of  
14 your disclosure. We've talked about your report and some  
15 materials that were produced back at the time of your  
16 report such as a CV and a testimony list and a fee  
17 schedule. We have those.

18 A. Yes.

19 Q. You also then produced some binders that  
20 included a listing of items generated?

21 A. Yes.

22 (Exhibit 289 marked.)

23 Q. Is 289 one such inventory?

24 A. Yes.

25 Q. We also looked at your Section E to your

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1 own materials, correct?

2 A. Yes.

3 Q. We marked, in fact, as exhibits everything  
4 in that Section E?

5 A. That's correct.

6 Q. What else, if anything, do you have in  
7 your book contrasting it with Mr. Kapp's book?

8 A. I would assume that you have the points  
9 that were generated by the GPS survey?

10 Q. I do not.

11 A. I have them in my book, and they are  
12 part -- if you want to --

13 Q. Sure. Let me just --

14 MR. KAPP: Let's go off the record real  
15 quick.

16 (Discussion off the record.)

17 (Exhibits 290 and 291 marked.)

18 Q. (By Mr. Brosseau) Exhibit 290, what is  
19 that, Dr. Ogden?

20 A. Exhibit 290 is our print of the GPS survey  
21 points that were gathered by the Wyoming Highway Patrol.

22 Q. Okay. Did you, yourself, or your company  
23 also measure the scene?

24 A. Yes.

25 Q. And did you use a scanner?

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1 A. Yes.

2 Q. Was it a FARO?

3 A. Yes.

4 Q. Do you have those data?

5 A. Yes.

6 Q. Are they here?

7 A. Yes.

8 Q. And, obviously, they're here  
9 electronically?

10 A. Yes.

11 Q. Is it on a disc that's in one of these  
12 folders?

13 A. Yes.

14 Q. You have -- I say you. Are you the one or  
15 was it the Wyoming Highway Patrol that provided the  
16 descriptions for many of those survey points?

17 A. Wyoming Highway Patrol.

18 Q. And you notice that there are some points  
19 where the Wyoming Highway Patrol described in those data  
20 fluid, correct?

21 A. Yes.

22 Q. Did you find any fluid in any location  
23 other than the eastbound lanes?

24 A. No.

25 Q. Exhibit 291 is the CV with attached

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1 testimony list that you gave me this morning?  
 2 A. Yes.  
 3 Q. And I understand that since we received  
 4 the last version that, among other changes, you are now a  
 5 P.E. in Wyoming?  
 6 A. Correct.  
 7 Q. When did you get your P.E. license in  
 8 Wyoming?  
 9 A. Oh, in Wyoming? It came within days after  
 10 I wrote this report. I actually submitted for my P.E.,  
 11 gosh, I want to say back in August. They only meet once  
 12 or twice a year. And I just missed their date, so it  
 13 might have been back in July when I submitted it.  
 14 Q. Did you pursue the P.E. for the purpose of  
 15 this case?  
 16 A. No. I do a lot of work in Wyoming, a lot  
 17 of work. Most of the work that I do is as an accident  
 18 reconstructionist. And in reality most of the  
 19 testimonies that I have are within the realms of an  
 20 accident reconstructionist that has specialties in  
 21 vehicle dynamics. But there was a -- I believe there was  
 22 a ruling a few years back where Wyoming said, You've got  
 23 to have a P.E.  
 24 Now that, of course, violates separation  
 25 of powers and probably come up to an issue where the

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1 state Supreme Court will say, No, you can't tell me what  
 2 happens in my courts. But with that said, most other  
 3 states have dealt with that, so I just went ahead and got  
 4 my P.E. in Wyoming.  
 5 Q. Did you face any challenge to your ability  
 6 to testify on the grounds of a practicing engineer?  
 7 A. Never.  
 8 Q. But to avoid such challenge, you decided  
 9 it was a good time to get the P.E.  
 10 A. Yeah, go ahead and by comedy get my P.E.  
 11 on my own, correct.  
 12 MR. KAPP: Off the record.  
 13 (Discussion off the record.)  
 14 Q. (By Mr. Brosseau) We have now, as far as  
 15 you know, covered everything in your book; is that right?  
 16 A. Yes.  
 17 Q. Okay. Then we have another binder which  
 18 is in Mr. Kapp's books as we broke them down earlier?  
 19 A. As the information provided to me.  
 20 Q. And there are 10 different sections to  
 21 this book?  
 22 A. The first notebook, yes.  
 23 Q. Okay. I'm sorry. Of these two notebooks  
 24 combined?  
 25 A. You are looking currently at Number 2.

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1 Number 1 is -- there you go. That's Number 1.  
 2 Q. Number 1 has Sections 1 through 8 and 2  
 3 has Sections 9 through --  
 4 A. 14, it should be, or 16.  
 5 Q. 14, maybe?  
 6 A. 14, yes.  
 7 Q. And is there material in every section?  
 8 A. Yes.  
 9 Q. Was anything removed?  
 10 A. No.  
 11 Q. And everything -- is everything in these  
 12 two binders hard copy of something? In other words, we  
 13 don't have anything that's stuck in here like a flash  
 14 drive or CD or DVD?  
 15 A. Correct.  
 16 Q. You identified in Exhibit 258, your  
 17 initial report, all of the materials that you reviewed,  
 18 including those provided to you as of the time of that  
 19 report, correct?  
 20 A. Yes.  
 21 Q. And since then, you added some materials  
 22 that were in Section E that became some deposition  
 23 exhibits today. You've also received the deposition of  
 24 John Smith with exhibits, and you've received the  
 25 deposition of Lew Grill with exhibits. And you've

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1 received a supplemental report from John Scott.  
 2 A. Also I received the disclosures because I  
 3 believe we had a simultaneous disclosure in this case.  
 4 So those I did not have at the time of my report either.  
 5 Q. So you received both FedEx and  
 6 Bridgestone's expert disclosures with reports attached;  
 7 is that right?  
 8 If you want to look at your materials,  
 9 please do so.  
 10 A. Please. Some of it I don't care to spend  
 11 much time on because it's not my area. You had included  
 12 FedEx's discovery?  
 13 Q. Yes, the disclosures.  
 14 A. I don't have that.  
 15 Q. Okay. So do you have a disclosure from a  
 16 FedEx retained expert named Dennis Ritchie?  
 17 A. No.  
 18 Q. Do you have -- is it correct you have  
 19 spoken with lawyers with three different law firms which  
 20 represented FedEx in this case?  
 21 MR. KAPP: You can answer yes or no.  
 22 A. Yes.  
 23 Q. (By Mr. Brosseau) Have you spoken with  
 24 lawyers from each of those three firms?  
 25 A. Yes.



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1 Q. In addition to lawyers, you've also had  
2 communications regarding this case with Mat Martonovich,  
3 correct?

4 A. Yes.

5 Q. Have you had any communications with  
6 others associated with OEC?

7 A. Yes.

8 Q. Who?

9 A. Courtney Engle.

10 Q. Anybody else?

11 A. Carson Ogden.

12 Q. Anybody else?

13 A. And Sherie Ogden.

14 Q. Is that it?

15 A. Yes.

16 Q. Who's Bill Mill?

17 A. Bill Mill is an investigator out of Fort

18 Collins.

19 Q. Have you had any communications with Bill  
20 in this case?

21 A. I haven't, no.

22 Q. Other than the people we've just mentioned  
23 or the entities being the law firms we just listed, prior  
24 to today, with whom have you, first of all, spoken, if  
25 anybody, regarding this case?

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1 A. I think that's it.

2 Q. Did you ever have conversations with Bill  
3 Woehrle regarding this case?

4 A. I may have very early on.

5 Q. What do you recall of that may have had  
6 conversation?

7 A. Nothing. I recall nothing. I think I may  
8 have, though.

9 Q. Other than perhaps Mr. Woehrle, any other  
10 people that I've mentioned? Are there others with whom  
11 you've spoken in connection with this case?

12 A. Yes.

13 Q. Who?

14 A. The tow truck driver that towed the FedEx  
15 vehicle to the location in Cheyenne where it was  
16 originally stored.

17 Q. Anybody else?

18 A. Not that I can recall.

19 Q. Have you had any conversations with any of  
20 the Wyoming Highway Patrol troopers regarding this case?

21 A. I may have, and I may have called them  
22 regarding information as far as vehicle locations, et  
23 cetera. However, I usually have my associates, either  
24 Mr. Martonovich or Ms. Engle, do that, so I do not know  
25 in this case whether I did or they did.

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1 Q. When you say "locations," you're talking  
2 about this then present locations that the vehicle would  
3 be stored?

4 A. No. At the time of -- at the time of our  
5 initial investigation the day after the collision  
6 occurred, one of the vehicles which I recall to be a  
7 Chevrolet Venture -- now that I think about it might have  
8 been the Chrysler -- was still present at the scene but  
9 had been pulled by a tow truck up to the offramp from  
10 I-80 onto College.

11 We requested information and called the  
12 police officer, and we may have done this through Amanda  
13 Good to find the location of the vehicles.

14 Q. When you say "find the location of the  
15 vehicles," what do you mean by find their location?

16 A. All three vehicles, where they had been  
17 towed to.

18 Q. Okay. So where they were located, not at  
19 the time they came to rest, so that you could go see  
20 them?

21 A. I knew where they came to rest because I  
22 was there to see the marks, so that was not an issue. It  
23 was more wanting to see where they were physically  
24 located for inspection.

25 Q. Okay. So that's what I think I was trying

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1 to get at when I said so you were trying to find where  
2 they were stored. It was where they were on November 9  
3 or some later date, not where they had come to rest on  
4 November 8; true?

5 A. Yes.

6 Q. Okay. Any other conversations that you  
7 recall?

8 A. Not that I recall.

9 Q. Other than your work in this case, have  
10 you done other work for Hirst Applegate?

11 A. Yes.

12 Q. Other than in this case, have you ever  
13 done work for Mr. Kapp or his firm?

14 A. One time.

15 Q. Tell me, what was the nature, generally,  
16 of the case?

17 A. I don't know the nature, but I know it was  
18 when I was still with Alcorn & Associates, so that would  
19 be the '90s.

20 Q. Other than whatever work you've done in  
21 this case, have you done other work for Murane &  
22 Bostwick?

23 A. Yes.

24 Q. On how many occasions?

25 A. Best I can do is estimate. 20, 30 times,

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1 maybe, over 25 years.

2 **Q. Have you ever been directly engaged by**  
3 **FedEx or any of its companies?**

4 A. Yes.

5 **Q. Have you ever been engaged directly by**  
6 **FedEx Ground?**

7 A. Yes.

8 **Q. To do what?**

9 A. To investigate a collision.

10 **Q. On how many occasions?**

11 A. Very few because usually it's through  
12 counsel, but very few.

13 **Q. How many times have you been engaged**  
14 **directly by FedEx or by counsel representing FedEx?**

15 A. Can I estimate?

16 **Q. Please do.**

17 A. Maybe a dozen times.

18 **Q. And how many of those retentions have been**  
19 **such that they required work from you over the last five**  
20 **or six years?**

21 A. Maybe half.

22 **Q. Do you have other current cases for FedEx**  
23 **or counsel representing FedEx?**

24 A. I have one.

25 **Q. To your knowledge, have you been disclosed**

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1 **as an expert in that case?**

2 A. Yes.

3 **Q. What is the case?**

4 A. It is a case on I-76 where a group of  
5 individuals intoxicated ran off the roadway and hit a  
6 section of guardrail, and that guardrail came out and  
7 blocked the entire width of I-76 in one direction as it  
8 careened off into a deep ravine and rolled down to the  
9 bottom of the ravine.

10 The FedEx driver observed a funny motion  
11 to his front. He slowed down. And as he got to an  
12 overpass structure where I believe it's E-470 crosses  
13 over I-76, he noticed there's a problem here. So he put  
14 on his hazard lights and stopped his vehicle in the lane  
15 in advance of the guardrail section that was protruding  
16 out into the roadway, got onto the cell phone to call 911  
17 and was struck in the rear by someone who drove into the  
18 back of an eight and a half foot by 13 foot fully  
19 illuminated flashing hazard lights truck and incurred  
20 some serious injuries as they struck the back of that  
21 truck.

22 **Q. Are you reconstructing that accident?**

23 A. It's already been done.

24 **Q. Have you testified?**

25 A. No.

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1 **Q. Is the file closed?**

2 A. No.

3 **Q. So it's a currently pending lawsuit?**

4 A. As far as I know, yes.

5 **Q. Do you know who is representing FedEx?**

6 A. It was Mike Sullivan before he passed, and  
7 then that was given to Ed Smalley, I think. I think it  
8 was Ed Smalley.

9 **Q. Have you ever been retained, or to your**  
10 **knowledge, have any of your firms, Alcorn or current firm**  
11 **or any other, been retained by Woodhouse Roden**  
12 **Nethercott?**

13 A. I don't know.

14 **Q. By The Fitzgerald Law Firm?**

15 A. I don't know.

16 **Q. By Kline, McCorkle & Pilger?**

17 A. I don't know.

18 **Q. By my law firm?**

19 A. I don't know.

20 **Q. To your best recollection, have you and I**  
21 **ever met?**

22 A. This is the first time you and I have met.

23 **Q. Have you ever been retained by Holland &**  
24 **Knight?**

25 A. I don't know.

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1 **Q. Have you ever been retained by Lathrop &**  
2 **Rutledge?**

3 A. Yes, I have.

4 **Q. What kind of matter or matters?**

5 A. Mostly trucking matters, by both Cory and  
6 John, in cases -- trucking matters mostly.

7 **Q. I'm sorry. I don't know who John is.**

8 A. Maybe it's not John. I thought it was --  
9 MR. KAPP: Kent.

10 A. Kent, yes, Kent.

11 **Q. (By Mr. Brosseau) Do you have any current**  
12 **matters for any of them?**

13 A. No.

14 **Q. When was the last time you had an active**  
15 **matter for Lathrop & Rutledge?**

16 A. On a case that was actually against FedEx,  
17 and that was the one that occurred up on top of Telegraph  
18 Hill that had 168 vehicles, the big fire, and multiple  
19 fatalities. That was about six years ago, I believe.

20 MR. KAPP: 10 years ago. Actually, it was  
21 longer than that, but --

22 **Q. (By Mr. Brosseau) We were in the process**  
23 **of inventorying your file. I'd like to continue that if**  
24 **we could so we can finish that process.**

25 **Have we now discussed all of the materials**

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1 which you believe you received subsequent to the issuance  
2 of your expert report?

3 A. I believe so.

4 Q. And have we now covered all of the  
5 documents that are contained within the two binders that  
6 we've described as Mr. Kapp's binders?

7 A. Actually, I don't know where he -- here's  
8 the -- Mr. Kapp is actually leaning on the other one.

9 Q. What is this third binder?

10 A. This is actually Book 1, which we reviewed  
11 through. And Book 2 is the one that's in here.

12 Q. So we have covered both of the Kapp  
13 binders?

14 A. Yes.

15 Q. We've covered the one binder that is your  
16 work product?

17 A. Yes.

18 Q. And then there is a blue folder that we've  
19 talked about some and we have covered everything in the  
20 blue folder?

21 A. I believe we have, yes.

22 Q. And then there is a file that had some  
23 electronically stored data, correct, among other things?

24 A. Yes.

25 Q. Okay. Within here are a couple of flash

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1 drives. Can you describe those contents?

2 A. Yes. One contains the raw scan files.

3 Q. Meaning the FARO data?

4 A. As processed by scene. The other contains  
5 photos.

6 Q. Okay.

7 A. And I have also duplicated all of the  
8 photos for today that -- I did this yesterday and  
9 downloaded not only our photos but any photo and video I  
10 was ever provided.

11 Q. Is that something that is something we can  
12 have, or is that something that you would like to keep  
13 and then we can maybe get a copy of it if we were even  
14 interested?

15 A. I would like to keep this because that way  
16 I have it with me in my file, but you can certainly copy  
17 it, if you would like.

18 Q. Okay.

19 MR. BROSSEAU: Mr. Kapp, in the event we  
20 have an interest in getting copies of these materials, do  
21 you have any problem with anything we should know at this  
22 point?

23 MR. KAPP: No.

24 MR. BROSSEAU: Okay. I just want to say  
25 if I -- to make it simple, if I want a copy of this stuff

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1 that Jerry has talked about, if I call you, assuming that  
2 I give you adequate amount of time, can I get it?

3 MR. KAPP: Yeah.

4 MR. BROSSEAU: Thank you.

5 Q. (By Mr. Brosseau) Tell me what else you  
6 have here in the way of electronically stored data.

7 A. These are file materials that were  
8 provided to us from Hirst Applegate and from Murane &  
9 Bostwick.

10 Q. All of which then would be identified in  
11 Exhibit 258, your expert report?

12 A. I think so. The reason why I pause is  
13 because I don't know that there may not be something from  
14 Murane & Bostwick that came after. But I believe that  
15 everything contained in Murane & Bostwick, all of these  
16 are actually contained in Notebooks 1, 2 and 3.

17 Q. Which we have already inventoried?

18 A. Yes.

19 Q. There is a green folder with some prints  
20 or laser copies of prints of photographs?

21 A. Correct.

22 Q. Are these also among the other materials  
23 that you have?

24 A. Yes. These are the photographs taken by  
25 the Wyoming Highway Patrol.

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1 Q. And then there is a second blue folder  
2 that has more photographs, prints, or proofs or laser  
3 prints -- not proofs -- laser prints or copies of  
4 photographs, all of which we've also talked about  
5 previously?

6 A. Yes.

7 Q. All of which you produced previously, as  
8 far as you know?

9 A. Correct.

10 Q. Okay. Have we now described the entirety  
11 of your file?

12 A. Yes.

13 Q. You testified regarding some braking that  
14 was done, in your opinion, by Mr. Kehler at some point  
15 after he departed the westbound lanes, most likely  
16 commencing in the median, correct?

17 A. Yes.

18 Q. In your opinion, did that braking commence  
19 before impact with the cable barrier? If you want to  
20 break it down into application of brake pedal versus  
21 effective deceleration of the vehicle, that's fine too,  
22 however you would like to do it.

23 A. It's possible there's -- I think that it's  
24 almost commensurate with striking the median cable  
25 barrier or shortly after.

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1 Q. And when you say "it," the application of  
2 the service brake or the effective commencement of the  
3 braking that likely commenced at or after the cable  
4 barrier?

5 A. The application.

6 Q. Okay. So effective braking of this  
7 tractor did not initiate, in your opinion, until  
8 three-tenths or so of a second after the cable barrier  
9 was struck, at the earliest?

10 A. Two-tenths to three-tenths, yes.

11 Q. At the earliest?

12 A. That's correct.

13 Q. Once the brakes were applied, did  
14 Mr. Kehler stay on the brakes to the point of the vehicle  
15 coming to rest?

16 A. Doubtful.

17 Q. Bases?

18 A. Well, our record shows that he's on it for  
19 about 7 seconds, but it actually takes about 10 seconds  
20 for the vehicle to come to rest after it strikes the  
21 Chevrolet. So sometime between impact and the Chevrolet  
22 and the impact with the Chrysler, he's going to come off  
23 the brake. And that's going to be due to the forces of  
24 the impact. He's not going to stay on the brake lightly.

25 Q. I either have been misunderstanding your

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1 testimony or misunderstood you here. My understanding is  
2 the total event from first documented tire mark to the  
3 final rest took between 10 and 11 seconds. Is that true?

4 A. Say that again.

5 Q. The total event from first documented tire  
6 mark to final rest took between 10 and 11 seconds; is  
7 that true?

8 A. That is correct.

9 Q. So it didn't take 7 or 8 or 10 seconds  
10 from impact with either minivan to rest?

11 A. Well, the impact with the Chrysler or --  
12 pardon me -- with the Chevrolet occurs at 4.56 to 4.7  
13 seconds into the entire event. So the entire event is  
14 acting 10 to 11. So it's 5 to 6 seconds of time period  
15 between the impact of the Chevrolet and the rest. So  
16 that's what I'm trying to get at.

17 Q. Gotcha.

18 A. Okay. Good.

19 Q. So the speed at impact into the Chevrolet  
20 and, in fact, into the Chrysler, you can't give us any  
21 definitive answer to except to say that if you apply a  
22 straight line acceleration, you can tell us what it is?

23 A. I can give you minimums, correct.

24 Q. Minimums would be based on the  
25 straight-line recognizing, in your opinion, you have two

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1 significant deceleration events being those two impacts?

2 A. Correct.

3 Q. Did the power interruption that is  
4 inferred from the -- at least inferred, maybe even  
5 expressed, from the ECM data for the tractor have any  
6 effect, in your opinion, on the recorded -- the obtaining  
7 or the recording of any of the historical data within the  
8 ECM?

9 A. Probably not.

10 Q. So if we look, for example, at historical  
11 data reporting speeds, peak speeds, or anything like that  
12 or RPM, any power interruptions that occur in the last  
13 few seconds of our crash didn't affect those data?

14 A. Probably not.

15 Q. Okay. Now, do you have a concern that you  
16 believe has a basis and probability for the  
17 reliability -- about the reliability of any of that  
18 historically recorded data?

19 A. I have a few, yes.

20 Q. Tell me what your concerns are.

21 A. Those peaks speeds can be very deceptive  
22 because wheel spin can create -- you have to remember.  
23 It's going off a tone ring and the wheel spin. If you're  
24 looking at issues with, say, for instance, the fault of  
25 an ABS sensor, it is actually reading from the ABS sensor

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1 on that wheel, which could be spinning at a different  
2 rate than other wheels on the vehicle are spinning.

3 If you're looking at the rates that are  
4 being determined in your historical data, wheel spin can  
5 create very, very momentary spikes that are different  
6 from the actual center of mass travel of the vehicle. It  
7 may not be representative.

8 We recognize this because a lot of times  
9 we receive historical data and one of the first elements  
10 you see is the vehicle traveling at 95 miles per hour.  
11 That's actually a wheel spin test that they do at the  
12 factory. Sometimes it's recorded, and you have no idea  
13 where that's coming from, so they can be somewhat  
14 deceptive.

15 Q. Do you have an opinion that any the peak  
16 speeds were reported in this instance involving this  
17 tractor to the extent the data was captured and reported,  
18 in fact, should not be believed?

19 A. I think they are what they are. I don't  
20 know what they're actually telling me. They tell me that  
21 is the peak speed, and I don't know what those are due  
22 to.

23 Q. Let me go to something else related to  
24 this topic, and that is hard brake event. Is it correct  
25 that a hard brake event can be recorded without regard to



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1 whether a service brake was ever applied?

2 A. Yes.

3 Q. It's simply the deceleration of the  
4 vehicle; it doesn't matter how it was decelerated?

5 A. That's correct.

6 Q. So, for example, you had a wheel spin that  
7 reported a spike in a speed, if it dropped off rapidly,  
8 that could reported as a hard brake event?

9 A. Not necessarily.

10 Q. But it could?

11 A. It's possible, but there are instances  
12 where it's not, and I can explain that.

13 Q. Does it have any reference to RPM?

14 A. It has some reference to RPM, but it has  
15 more reference to do with the fact that this is a 1-hertz  
16 system. And so if it's not -- if it doesn't catch the  
17 actual drop, then it won't fire off something that's  
18 instantaneous like that. If it instantly peaks and comes  
19 back down, it's not going to catch that.

20 Q. You have to have an adequate segment in  
21 time?

22 A. That's correct.

23 Q. Is there any other reason that you might  
24 have questions about those historically recorded data  
25 other than what we've already talked about?

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1 A. I don't think so, no.

2 Q. Okay.

3 MR. BROSSEAU: If I don't draw an  
4 objection -- if I pass the witness for now, Paul, can I  
5 come back as I check my notes, or would you like me to  
6 take a break now?

7 MR. KAPP: You can pass.

8 MR. BROSSEAU: And then return?

9 MR. KAPP: I don't think I can -- I don't  
10 know that we, as lawyers, have ever really been  
11 successful in stopping.

12 MR. BROSSEAU: I just want to make sure  
13 it's okay.

14 MR. KAPP: Go ahead.

15 MR. BROSSEAU: And for that, I will for  
16 the moment at least pass the witness.

17 EXAMINATION

18 BY MR. J. FITZGERALD:

19 Q. All right. So you went to the scene on  
20 November 9; we know that?

21 A. Yes.

22 Q. About 16 hours after the wreck?

23 A. I believe that's correct, yes.

24 Q. Who went with you?

25 A. Mathew Martonovich.

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1 Q. Was it only the two of you?

2 A. Yes.

3 Q. I'm going to hand you what we'll mark as  
4 the next exhibit, although I'm sure somewhere in this  
5 record it's already been marked.

6 (Exhibit 292 marked.)

7 Q. Is Mr. Martonovich in that photograph?

8 A. Yes. He's dressed like an orange covered  
9 eskimo.

10 Q. He's across the highway, correct?

11 A. He is.

12 Q. He's on the eastbound lane -- excuse me --  
13 the westbound lane, right?

14 A. No. He's actually off of the shoulder on  
15 the eastbound side.

16 Q. He's on the north side of the interstate?

17 A. He's on the south side.

18 Q. Well, which way are these marks going?

19 Are they going from the westbound lane to the eastbound  
20 lane or vice versa?

21 A. They're going from the westbound to the  
22 eastbound which means they're oriented towards the  
23 southwest.

24 Q. All right. You see the tire pieces in  
25 that exhibit?

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1 A. I see one, yes, and I see another one down  
2 here at the left.

3 Q. What's the number?

4 A. 292.

5 Q. Did you and Mr. Martonovich pick up those  
6 pieces of tire tread?

7 A. No.

8 Q. Did you pick up any pieces of tire tread?

9 A. No.

10 Q. Why not? Why didn't you pick up the  
11 pieces of tire?

12 A. That is a no-no. If there is evidence  
13 that is on a roadway, you leave it for others to look at.  
14 And I will not touch or move any evidence.

15 Q. Did you tell anybody that they're going to  
16 need to look at that evidence?

17 A. No.

18 Q. Did you talk to the highway patrol about  
19 preserving that evidence?

20 A. No.

21 Q. You were, to your knowledge, one of the  
22 first people, if not the first -- let me strike that.

23 Do you know if any FedEx representative  
24 had been to the scene before you were there?

25 A. I have no knowledge. I don't know.

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1 **Q. Would it be important for somebody to**  
 2 **preserve those pieces of tire for this case?**

3 MR. KAPP: Object to form; calls for  
 4 speculation.

5 A. It's actually outside my scope. I'm not a  
 6 tire guy, so you would have to ask a tire guy when a tire  
 7 guy went out there, but I'm not a tire guy.

8 **Q. (By Mr. J. Fitzgerald) Did you undertake**  
 9 **any effort with FedEx to tell them, Hey, there's pieces**  
 10 **of tire out here, you probably want to get them**  
 11 **preserved?**

12 A. No.

13 **Q. Why not?**

14 A. Because I need to leave it at the scene  
 15 for others to come by and to see, and I will not do that.  
 16 I will not remove evidence off of a roadway that could be  
 17 important for someone else to see. I feel that that is a  
 18 violation of my practice.

19 **Q. And maybe I've asked this, but let me say**  
 20 **it again. I just want to make sure I understand**  
 21 **correctly. Even though you saw pieces of tire out there,**  
 22 **you didn't make any effort to tell FedEx you probably**  
 23 **better preserve these tire pieces. Am I right?**

24 A. Yeah. That's not my job, no.

25 **Q. Please turn to Exhibit 263. You should**

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1 **have it in there in front of you. It's the one where you**  
 2 **the drew the circles around the little gouge marks made**  
 3 **by the rim.**

4 A. Yes.

5 **Q. Now that you have that before you, am I**  
 6 **correct that you intended to draw these circles around**  
 7 **the gouge marks created by the rim?**

8 A. Yes.

9 **Q. Okay. I'm going to come over and I'm**  
 10 **going to use this home-made model here and make sure I'm**  
 11 **correct. Please show us using this to represent the rim.**  
 12 **This is a circular object, roughly, very roughly, the**  
 13 **shape of a tire rim. All right. A rim, a wheel. And**  
 14 **you have now put it on the Exhibit 263, correct?**

15 A. Yes.

16 **Q. Okay. Let me line this one up right on**  
 17 **top of the mark. Have I done that right?**

18 A. I have no idea.

19 **Q. Well, you want to line it up right under**  
 20 **the mark?**

21 A. Which mark are you talking about?

22 **Q. I just pointed it out. Well, that's your**  
 23 **circle. Do the edge, please. I'm probably not making**  
 24 **myself clear.**

25 A. May I have my glasses here?

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1 **Q. This is what we're trying to do. Let me**  
 2 **show you. We're trying to get it right to the edge of**  
 3 **this device, this little model we've created right on**  
 4 **top.**

5 **Okay. Now, I realize -- you're an old**  
 6 **artillery man. We won't use mills, but in terms of**  
 7 **degrees, what is the degree, counting this is zero -- you**  
 8 **got a protractor with you, don't you?**

9 A. I do.

10 **Q. Yeah. Let's see -- so the exercise here**  
 11 **is to try to determine -- let's do this. Use this -- let**  
 12 **me move this piece of paper. So we have a reference**  
 13 **point, let's call the top of this paper zero. Okay?**

14 A. Okay.

15 **Q. So your protractor would pretty much have**  
 16 **to go like that, wouldn't it?**

17 A. Well, if you want to orient that way, but  
 18 that's not how the road is oriented. The road is  
 19 oriented like this. This line, as I'm showing you here,  
 20 should be one of your axes, if you really want to know  
 21 what's going on with that mark.

22 **Q. Well, in relative terms, you could use the**  
 23 **top of the paper, right?**

24 A. Well, I can, but here's an issue that you  
 25 deal with. Notice something here. If I draw a line in

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1 my photograph where I look at the right side and I'm  
 2 right along that center line, you can see -- and the left  
 3 side -- it's wider on the left side of the photograph  
 4 than it is on the right. That is parallax issue. So you  
 5 can't really line those up in that manner because this is  
 6 not taken orthogonal to the photo, but it's taken across  
 7 from the photo.

8 **Q. All right. Let me just come straight to**  
 9 **the point. Even using your rough circle here, it looks**  
 10 **like this line and this line would intersect as opposed**  
 11 **it being parallel to one another. Wouldn't you agree?**

12 A. Well, I think they are crossing because  
 13 they're asynchronous. They were not occurring at the  
 14 same time.

15 **Q. Fine. And how many seconds or portions of**  
 16 **seconds are they apart, speaking of asynchronicity?**

17 A. Milliseconds probably. And so you're  
 18 looking at a wheel that's gouging in and maybe rotating  
 19 but still gouging in one direction while the other side  
 20 comes down and gouges this way.

21 **Q. And how much time -- how much distance are**  
 22 **we talking about? How far do they travel as they're**  
 23 **being in different angles?**

24 A. I don't know, and I can't tell from this  
 25 photo.

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1 **Q. Is it a matter of inches?**

2 A. No. I would say it's probably a matter of  
3 several inches. If I'm looking at it here, you'll see  
4 one gouges in and the other one starts. They're not  
5 actually necessarily side by side when going through.

6 **Q. Right. So I just want to make sure I'm**  
7 **clear. You're saying in whatever time it took, this rim**  
8 **would have been oriented parallel one of the marks and**  
9 **within inches and milliseconds, it would be oriented in a**  
10 **somewhat different direction. Is that what you're**  
11 **saying?**

12 A. Well, the contact points are. Remember,  
13 one contact point is different than the other. So one  
14 contact point hits, and it changes its shape while the  
15 other one hits and begins to change its shape.

16 **Q. What's the shape?**

17 A. The shape is changed due to the friction  
18 and the grinding of the material, meaning the aluminum  
19 rim and the roadway. And that can happen very quickly.

20 **Q. Did you find any aluminum shavings in**  
21 **either of these marks?**

22 A. No.

23 **Q. Did you look for them?**

24 A. They're usually gone; they usually don't  
25 stick around very long.

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1 **Q. You didn't even look, though, right?**

2 A. Yes, I did. I took photographs, but I  
3 didn't see any.

4 **Q. What's the closest photograph you took?**

5 A. I have some back in here. When you have  
6 aluminum shavings, they stand out. I've done numerous  
7 accidents with that. And, typically, those are gone with  
8 traffic because the aluminum shavings -- aluminum is very  
9 light. It does not molecularly bond with the asphalt.  
10 It is basically a flake. And along comes a wind, and off  
11 it's gone. And they usually don't last but maybe an hour  
12 or so.

13 **Q. Are you speaking of ambient wind or wind**  
14 **caused by traffic?**

15 A. Yes, both.

16 **Q. Just so we're clear, your testimony is**  
17 **that although this mark and this mark would intersect,**  
18 **that's because in this very short period of time, very**  
19 **short distance, the rim is moving around, right, in terms**  
20 **of the axis?**

21 A. There's more to it than that. Remember  
22 what I showed you before. Take the center line. And I  
23 go along the center line. In reality, we know that the  
24 center line is spaced evenly from the yellow edge line,  
25 yet when I place another edge on it, I can see these two

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1 lines intersect. That is -- the horizon effect when you  
2 used to do art when you were a kid, that's a part of  
3 what's happening here. These are not as crossed as they  
4 appear to be. They are actually more in line, but they  
5 are asynchronous.

6 **Q. Actually, they would have to extend a ways**  
7 **to be crossed, wouldn't they? They're not crossing in**  
8 **this photograph, are they?**

9 A. No. But I'm saying part of what you're  
10 seeing is the parallax effect. So you're assuming that  
11 looking at this photograph that the orientation of these  
12 are more severely crossed than what they actually are,  
13 and that's due to the depth and the parallax of the  
14 photo. This is taken at the side, not straight on.

15 **Q. You mean if they were crossed because they**  
16 **aren't crossed?**

17 A. No. You said draw a line between these  
18 marks.

19 **Q. I want to make sure we're clear. On what**  
20 **you've circled here, those lines aren't crossed with each**  
21 **other, are they?**

22 A. Not here.

23 **Q. Okay.**

24 A. And that's because when we look at them,  
25 they're asynchronous and they're being produced as the

Page 216

1 vehicle tire or that wheel is rotating already to the  
2 left.

3 **Q. Why are they so short?**

4 A. I don't know because they came down and  
5 made contact with the road. And they went back up  
6 without contact with the road, and that can happen.

7 **Q. Okay. Did you examine any of the pieces**  
8 **of the tire at the scene -- I mean remnants of the tire?**

9 A. I did, but they were just shredded pieces  
10 of cord and they mean nothing to me. There's nothing I  
11 can see from it.

12 **Q. You picked them up and put them back down?**

13 A. I did not pick them up. I looked at them  
14 on the ground. I do have photographs of them.

15 **Q. Was the highway patrol officer present at**  
16 **the scene when you were there?**

17 A. No.

18 **Q. When did you first see the subject left**  
19 **tire?**

20 A. I saw it that day.

21 **Q. When?**

22 A. It's in the properties of my photos. So  
23 it will tell us --

24 **Q. Give me a general idea. Did you go to the**  
25 **scene first and then go to the tractor?**

Page 217

1 A. Yes.

2 **Q. You examined the tractor on November 9,**

3 **right?**

4 A. Yes.

5 **Q. December 19 of 2014, correct?**

6 A. I didn't; Mat did.

7 **Q. Somebody from OEC did, correct?**

8 A. Yes, Mr. Martonovich.

9 **Q. And January 20, somebody from OEC again**

10 **examined the tractor?**

11 A. Yes.

12 **Q. And April 7, 2015?**

13 A. I believe that's correct.

14 **Q. Was any physical evidence ever collected**

15 **on any of those dates?**

16 A. Photographs were taken, yes.

17 **Q. No, I'm sorry. Anything physically, not a**

18 **photograph?**

19 A. Yes.

20 **Q. A device?**

21 A. Yes.

22 **Q. What did you collect?**

23 A. We, at the request of Ms. Good, obtained

24 the GPS unit, and that was on, I believe, November 9, and

25 obtained the GPS unit from the vehicle. And I also -- I

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1 personally downloaded the ECM.

2 **Q. Did you draw any physical evidence at any**

3 **time from the tractor?**

4 A. No. That's it. I believe that Ms. Good

5 may have removed the driver's log, but I don't know that

6 for sure.

7 **Q. Did anybody else on behalf of FedEx remove**

8 **anything while you were or Mr. Martonovich was present?**

9 A. No.

10 **Q. Who removed the left front steer tire?**

11 A. We did. We removed that, and I don't know

12 where that was done at.

13 **Q. Who's you? You and Mr. Martonovich?**

14 A. No, I did not. OEC Forensics was present

15 for it, and I think it was done through -- because we

16 don't have capabilities of lifting the vehicle. But it

17 was done in conjunction with some mechanical shop. And I

18 don't know personally which one it is because I did not

19 prepare for that to know what that was today.

20 **Q. Did you check the inflation -- did you**

21 **check the inflation of the right front steer tire on**

22 **November 9?**

23 A. After it was raised -- on November 9?

24 **Q. Correct.**

25 A. I believe that we inspected and documented

Page 219

1 all of those inflations. And I asked Mat where those

2 notes were, and he couldn't remember where the notes

3 were. But he remembered doing the same thing. But I

4 have no notes.

5 So without notes, the answer is, no,

6 because I have no evidence. But I recall doing it, and I

7 don't know where those notes are.

8 **Q. Do you recall what the inflation was that**

9 **you found on the right front tire?**

10 A. If I recall right, there were no inflation

11 issues on any of the tires. They were all within about

12 105 PSI to 110 PSI, but I don't have my notes. And so I

13 can't tell you.

14 **Q. Why do you take notes?**

15 A. I take notes to be able to keep notes.

16 And so the only thing I can think of is in the process of

17 putting all of our notes together, that that note somehow

18 did not get put in my file. But I recall very clearly

19 doing that because we have a sheet that we record all of

20 the brake measurements on. And sometimes we'll record

21 tire information there too.

22 But we have another sheet that we use to

23 report tire information on as well, and I recall using

24 that sheet. But I don't have it and I don't know what

25 happened to it. I don't know whether we did that

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1 electronically, meaning on an iPad, filling out the form

2 and it never got downloaded or whether we did that with

3 an actual physical sheet and it didn't get put into the

4 folder.

5 **Q. You sent the tire to Mr. Woehrle, the left**

6 **front tire?**

7 A. I don't know for sure whether we did that

8 and arranged that or whether that was done by Hirst

9 Applegate or Lloyd Smith.

10 **Q. Do you know that it was sent to**

11 **Mr. Woehrle?**

12 A. I believe it was, but I don't know for

13 sure.

14 **Q. When is the first you ever heard of**

15 **Mr. Woehrle in relation to this case?**

16 A. I believe that was when Lloyd Smith was

17 handling the case.

18 **Q. So you hadn't even heard of Woehrle at the**

19 **time -- within a couple of days of the wreck; is that**

20 **right?**

21 A. Well, no. I've heard of Mr. Woehrle

22 before. You mean in conjunction with this case?

23 **Q. Yeah. Let me be more direct. Within a**

24 **couple of days of this wreck, the tire is on its way to**

25 **Mr. Woehrle, okay? You didn't know that?**



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1 A. No, I didn't know that, so that must have  
 2 been handled by Hirst Applegate.  
 3 **Q. Did you see the radar detector mount in**  
 4 **the cab when you were there on November 9?**  
 5 A. I don't remember, specifically.  
 6 **Q. I'm only talking about this mount.**  
 7 A. I don't remember, specifically.  
 8 **Q. You didn't see a radar detector then, did**  
 9 **you?**  
 10 A. I don't remember, specifically.  
 11 **Q. Did you take any photographs of the cab as**  
 12 **it was?**  
 13 A. Yes.  
 14 **Q. When you were there?**  
 15 A. Yes. And they are contained in my file.  
 16 **Q. Can you see a radar detector mount in any**  
 17 **of those?**  
 18 A. I don't know. We could look at it, if you  
 19 want.  
 20 **Q. Well, let me just ask you this. If there**  
 21 **is a radar detector mount, you would be able to tell that**  
 22 **from a photograph, right? I mean, a radar detector mount**  
 23 **is not a really hard thing to see, is it?**  
 24 A. Well, it depends on the brand of radar  
 25 detector. They are different. And the GPS can have the

Page 222

1 same mount as a radar detector, as a phone mount, so the  
 2 distinction between them is not something I would  
 3 necessarily know.  
 4 **Q. Are you interested in figuring out whether**  
 5 **these drivers have been using a radar detector?**  
 6 A. Quite honestly, I could care less whether  
 7 they do or not. It has nothing to do with the physical  
 8 evidence or analysis of an accident.  
 9 (Exhibit 293 marked.)  
 10 **Q. Whose hand is that?**  
 11 A. Mat Martonovich.  
 12 **Q. Did you look at this document?**  
 13 A. No.  
 14 **Q. Only Mr. Martonovich?**  
 15 A. Well, he photographed it, yes.  
 16 **Q. Is it clear enough for you to read down**  
 17 **there where it says DOT required pretrip inspection?**  
 18 A. Yes.  
 19 **Q. Nothing is marked, is it?**  
 20 A. Not on this form.  
 21 **Q. Do you see where it says at the top,**  
 22 **Destination is 0841/Salt?**  
 23 A. Yes.  
 24 **Q. And this is the subject tractor, right,**  
 25 **125417?**

Page 223

1 A. It is.  
 2 **Q. Is it any concern to you that the pretrip**  
 3 **inspection was not marked?**  
 4 MR. KAPP: Object to the form. This  
 5 witness isn't being offered in that area and the area of  
 6 compliance with any sort of practices or regulations  
 7 regarding commercial truck.  
 8 A. No.  
 9 **Q. (By Mr. J. Fitzgerald) It doesn't concern**  
 10 **you that it's not marked?**  
 11 A. Not in the least.  
 12 **Q. Well, let me show you the next exhibit.**  
 13 (Exhibit 294 marked.)  
 14 **Q. You can see a readout there where it says,**  
 15 **IS Fleet Services, correct?**  
 16 A. I do.  
 17 **Q. And let me just make sure I'm clear. I**  
 18 **take it it means nothing to you that the 6:54 a.m.**  
 19 **inspection was skipped?**  
 20 MR. KAPP: Same objections.  
 21 A. It doesn't. This is Steve Marks' record  
 22 long before Mr. Kehler took over.  
 23 **Q. (By Mr. J. Fitzgerald) Do you know**  
 24 **anything about the requirement for pretrip inspections?**  
 25 MR. KAPP: Same objections.

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1 A. In general, I do, if I need to look at it  
 2 specifically, but I did not review that because I'm not  
 3 retained as an expert in that area.  
 4 **Q. (By Mr. J. Fitzgerald) And you're not**  
 5 **retained as an expert in airbags either, right?**  
 6 A. Well, I don't know about that.  
 7 **Q. So are you going to offer opinions about**  
 8 **the airbags in this case?**  
 9 A. I will regarding the fact that a command  
 10 was sent and the airbags did not deploy, certainly, yes.  
 11 **Q. You have no explanation precisely as to**  
 12 **why, right?**  
 13 A. Yeah. We don't, and I --  
 14 **Q. You would have to speculate?**  
 15 A. Well, no. I'm not going to speculate.  
 16 There are reasons why it can, and one of the reasons why  
 17 we know it didn't. That isn't a reason is the fact that  
 18 there was not enough energy. We know there was because  
 19 the capacitors were charged, and it indicates the  
 20 capacitors were charged. So we have an interruption  
 21 somewhere. That can be investigated, but that is -- that  
 22 portion is not part of my analysis.  
 23 **Q. Right.**  
 24 A. I wasn't asked to do that portion.  
 25 **Q. Right. And you haven't investigated, have**

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1 you?

2 A. I have not; I haven't been asked to.

3 Q. Were you even shown the records from

4 Cowboy Dodge showing the ORC manual went into the shop in  
5 March of 2014? Have you seen Cowboy Dodge records of  
6 that?

7 A. No.

8 Q. Nobody has shown you those?

9 A. I have no records of it, no.

10 Q. So let me just make sure we're real clear.

11 Other than saying that, in your opinion, there was an  
12 interruption of electricity from the capacitor to the  
13 module, you have no further information for us in terms  
14 of an opinion held to a reasonable degree of probability  
15 in your field as to why the airbags did not deploy; is  
16 that right?

17 A. That's correct.

18 Q. Okay. Let me show you 295.

19 (Exhibit 295 marked.)

20 Q. Do you recognize that as a tire gauge?

21 A. I do.

22 Q. Do you recognize that's showing inflation  
23 of about 94 pounds?

24 A. I do.

25 Q. Is that something you did?

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1 A. No. This is Mat Martonovich after the  
2 front end of the vehicle had been lifted off the ground  
3 before the removal of the right front tire.

4 Q. So that was done on November 9, correct?

5 A. No. This was done whenever we removed the  
6 right front tire which was, I believe, in January. I'm  
7 not sure.

8 Q. Okay. Is that Mr. Martonovich's hand in  
9 the -- folding the gauge?

10 A. His hand and his feet, yes.

11 (Exhibit 296 marked.)

12 Q. Does that photograph refresh your  
13 recollection what the inside of the cab looked like when  
14 you were there on November 9?

15 A. Yes.

16 Q. Do you know what those two mounts are that  
17 we see there?

18 A. No.

19 Q. I'm going to show you what's marked for  
20 identification as 297.

21 (Exhibit 297 marked.)

22 Q. Do you recognize that blue more or less  
23 square shaped object on the lower left-hand corner of the  
24 photograph that appears to be plugged into something  
25 inside the cab?

Page 227

1 A. I do.

2 Q. Is that yours?

3 A. It is.

4 Q. What is it?

5 A. It's a Nexiq link that allows you to be  
6 able to communicate through CAN bus with the ECM. And  
7 that's Mat taking a photograph that shows my connection  
8 to the Deutsch cable or the Deutsch connection in the  
9 inside of the cab as I'm doing that download.

10 Q. Did you use any other devices than that to  
11 do the download?

12 A. Yes.

13 Q. What else did you use?

14 A. My computer.

15 Q. And does that computer still have that  
16 original data on it?

17 A. Probably not. It was transferred over and  
18 that is contained within the electronic copy of our file  
19 of the prints.

20 (Exhibit 298 marked.)

21 Q. Is that Mr. Martonovich's thumb.

22 A. I don't know.

23 Q. You don't know?

24 A. I don't. I don't know whether that's his  
25 or mine. I can't tell.

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1 Q. Can you tell whoever it is is holding?

2 A. Looks like the Garmin GPS.

3 Q. Does it look like the front or the back of  
4 the Garmin GPS?

5 A. That's the back.

6 Q. That would be facing the road, correct?

7 A. I have no idea what you're talking about.

8 Q. Well, the object has -- at least it has  
9 width and depth, a right side and a left side and so  
10 forth, right, GPS?

11 A. Sure.

12 Q. And if you have it turned one direction,  
13 you can see information like where you are, correct?

14 A. Yes.

15 Q. But that doesn't appear what's shown in  
16 298?

17 A. That's correct.

18 Q. This appears to be the other side of the  
19 GPS, right?

20 A. It's the connection side, yes.

21 Q. Is that a camera there?

22 A. I have no idea. I can't tell. It looks  
23 like the ball joint mount where it snaps into its mount,  
24 but I really don't know. I don't think so.

25 Q. How about on the other piece -- I'll just

Page 229

1 point to you what I'm looking at. In the upper left to  
2 the left of the thumb and the upper left of the black  
3 object, is that a camera?

4 A. That's a symbol that says G for Garmin.

5 Q. Is there a camera on the Garmin GPS?

6 A. I don't think so. I think what this is is  
7 the power unit, and that's where it snaps in to be able  
8 to move it. I don't think that's a camera lens. It's  
9 actually a spot where it snaps into the bracket. The  
10 bracket has a ball on the end, and it snaps in and you  
11 can move it around. I think that's what that is.

12 Q. Did OEC inquire as to whether there was  
13 any video that came from this Garmin GPS?

14 A. We took possession by instruction of the  
15 GPS, and it had no camera on it, so --

16 Q. I thought I heard you say earlier that  
17 perhaps Amanda Good took possession of it.

18 A. No. Mandy Good instructed us to take  
19 possession. We informed her that it was present, and she  
20 didn't want somebody to rifle through the vehicle and  
21 steal anything, because that can happen, unfortunately.  
22 But she instructed us to take possession of that.

23 Q. Where did you take it?

24 A. We maintained it, and we -- I think  
25 we -- no. We provided that for download, but we had it

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1 in a -- wrapped in bubble wrap and evidence -- the  
2 antistatic evidence and into an envelope.

3 Q. Who did you give it to?

4 A. We gave that to Mandy Good.

5 Q. When did you give it to Mandy Good?

6 A. I don't know. I think it was done -- it  
7 was done either later that day or it was mailed to her  
8 later.

9 Q. Was she at the scene with you?

10 A. Yes.

11 Q. Was she already there when you got there?

12 A. No. She showed up after we had already  
13 arrived.

14 Q. Was anybody with her?

15 A. Yes.

16 Q. Who?

17 A. Her husband and one of her children.

18 Q. Was she there the whole time you were  
19 there?

20 A. No.

21 Q. How long was she there?

22 A. I can only estimate, maybe 15 minutes, 20  
23 minutes, most.

24 Q. Did you observe the -- well, when you saw  
25 it, was the left front tire still on its rim?

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1 A. It appeared as it does in my photographs.

2 Q. Was it removed from the rim?

3 A. Partially, yes, or if not fully -- I think  
4 it was resting.

5 MR. KAPP: Are you asking, did he remove  
6 it from the rim, or was it removed from the rim?

7 Q. (By Mr. J. Fitzgerald) Did somebody  
8 remove it from the rim?

9 A. No. It was still associated with the  
10 wheel. You can clearly see it in the photographs.

11 Q. You didn't do anything to change its  
12 relation to being on the rim, right?

13 A. No, nothing whatsoever.

14 Q. Did you box it up?

15 A. No.

16 Q. Do you know who removed it from its rim?

17 A. I don't recall who removed it from the  
18 rim. I know that Mat had coordinated that through Hirst  
19 Applegate, and it was -- this is not on the date of  
20 inspection. This occurred after. And then it was  
21 removed by a mechanic who also had the capabilities of  
22 lifting that vehicle to be able to do so. But I don't  
23 know that location. Mr. Martonovich would know that, but  
24 I don't.

25 Q. Let me just make sure I'm clear on this.

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1 Are you saying that was done at the time the truck was  
2 lifted up, so it could have been the same time the  
3 inflation was measured in the right wheel?

4 A. No. Those were removed two separate  
5 times. The left front was removed earlier. I believe it  
6 was still in Cheyenne, but I don't -- I wasn't there, so  
7 I don't know when that was done. That was coordinated  
8 through Hirst Applegate. Then the right front was  
9 removed at a later date.

10 Q. Our review of the records shows that the  
11 highest speed recorded during November 2014, as printed  
12 by your firm, OEC Forensics, was 86.5.

13 Do you have any reason to dispute that?

14 A. I think that's in my report.

15 Q. The highest speed recorded in October 2014  
16 was 89.5.

17 Do you agree with that?

18 A. Yes.

19 Q. And then in September the highest speed  
20 recorded was 89 miles per hour.

21 Do you agree with that?

22 A. Yes.

23 Q. As far as your opinions go in this case,  
24 do those high speeds have any meaning?

25 A. No. As I addressed before, we don't know

1 what they are or what produced those.

2 **Q. You don't know what they are?**

3 A. No. The reason why is because if you have  
4 wheel slip, that does not necessarily -- it may record a  
5 wheel speed of that, but that does not necessarily mean  
6 it correlates with the velocity of the vehicle.

7 **Q. Are you going to be offering any opinions**  
8 **on how fast these drivers drove this tractor with these**  
9 **tires on it at the time the tires were purchased at any**  
10 **time?**

11 MR. KAPP: Object to the form to the  
12 extent that there are matters contained in his report,  
13 but I'll let the witness answer the question.

14 Go ahead.

15 A. The only thing I can opine to is the data  
16 I have in my report. And so that's the only thing I will  
17 opine to.

18 **Q. (By Mr. J. Fitzgerald) I thought I heard**  
19 **you just make room for an opinion that tires -- that the**  
20 **data may overstate the speed they were actually driving.**  
21 **Can you offer that opinion at trial?**

22 A. If you read page 29 of 46 of my report,  
23 it's actually contained there. I discussed that. I  
24 discuss wheel slip. And I discuss how wheel slip can  
25 overreport speeds. And so we don't know what produced

1 that. We don't know who produced that.

2 And so there's -- all it tells you is a  
3 glimpse in time, but it does not tell you where, who,  
4 what, and why. And so that's why -- it's used oftentimes  
5 as a diagnostic measure for those that are looking to see  
6 if there is any indications of chronic overspeed.

7 **Q. Well, let me ask you this: Who besides**  
8 **Kehler and Marks may have gone as fast as whatever 89**  
9 **computes down to based upon your opinions?**

10 MR. KAPP: Object to the form; misstates  
11 his testimony about whether anyone went that fast.

12 MR. J. FITZGERALD: No, I'm making room  
13 for you to lower that speed down. I want to know who  
14 would have done it besides Mr. Kehler or Mr. Marks.

15 MR. KAPP: Same objections.

16 A. Well, let's look at, first of all, what  
17 this means.

18 **Q. (By Mr. J. Fitzgerald) No. Let's go with**  
19 **who's driving this truck besides Kehler and Marks?**

20 A. Well, we have the individuals that are  
21 doing maintenance on the truck. They're driving it.  
22 And, in fact, if you're driving the truck and you're  
23 doing maintenance on a vehicle, you will also test-drive  
24 the truck after you've done maintenance.

25 **Q. How far is it from Redbone to the FedEx**

1 **yard hub?**

2 A. I have no idea, but it's not the distance  
3 from the Redbone to the FedEx yard. I believe they park  
4 it right outside. But when you test-drive, you're not  
5 going to test-drive it across the street; you're going to  
6 take it somewhere and drive it.

7 **Q. Is it your testimony that this truck was**  
8 **not parked at the FedEx hub on FedEx properties?**

9 A. No, it's not my testimony. I'm relating  
10 this back to the deposition testimony that we already  
11 have, so I'll state it clearly.

12 The driver, Mr. Kehler, says that he parks  
13 the vehicle. And when he leaves it, when they're off  
14 duty, then Redbone will come pick up that truck to do  
15 maintenance.

16 As part of your maintenance, if you are  
17 doing anything from a front wheel alignment or any other  
18 kinds of maintenance, routine maintenance, on the truck,  
19 you will test-drive it. If you're putting new brakes on  
20 a vehicle, not only do you test-drive it, but you burnish  
21 those. You do hard braking to be able to get those pads  
22 so that they are seeded and you have proper friction.

23 So that's all done as a maintenance  
24 operation. So those are potential individuals that could  
25 have driven that truck aside from Mr. Marks and Mr.

1 Kehler.

2 **Q. As a mathematician, how would you**  
3 **calculate the odds that it was service companies on all**  
4 **three of the high speeds they gave you, November's high**  
5 **of 86.5, October's high of 89.5, and September's high of**  
6 **89.5?**

7 MR. KAPP: Object to the form.

8 A. First off, I'm not a mathematician or  
9 statistician. Secondly, it's not my opinion. You asked  
10 me specifically who else drives it. I gave you that  
11 indication. It's not me stating that someone else is  
12 driving that. But you're misinterpreting those peak  
13 speeds.

14 I think you believe that that peak speed  
15 correlates directly to the vehicle speed. That does not  
16 necessarily correlate. Wheel slip, which can easily  
17 occur, particularly on a bobtail or a lightly loaded  
18 vehicle, wheel slip can have those wheels spinning much  
19 faster than the actual motion of the vehicle.

20 And so what you see there I cannot tell  
21 you whether that's the over-the-road speed, whether  
22 that's induced by wheel slip or whether that's somebody  
23 else driving, because I really can't tell you. I wasn't  
24 there when these were produced.

25 **Q. (By Mr. J. Fitzgerald) Do you have some**



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1 opinion on what the 89 would translate to based on any or  
2 all of these factors?

3 A. I can't, and none of us can. That's the  
4 problem by relying solely on these peak speeds because  
5 these peak speeds do not tell you the who, what, where,  
6 when, or how. All it is is a dummy switch that records a  
7 number.

8 Q. So I just want to make sure I'm clear.  
9 We're not going to hear some opinion from you at trial  
10 that, well, although the recorded speed in September at  
11 its high was 89 miles an hour, it really was some other  
12 number like 85?

13 MR. KAPP: Object to form.

14 Q. (By Mr. J. Fitzgerald) Are you going to  
15 offer that kind of an opinion?

16 A. You're not familiar with me, I take it.

17 Q. I just want to make sure we're not going  
18 to hear a different number than 89. It's going to be  
19 something -- it might be different, but we're not  
20 actually going to have a number?

21 MR. KAPP: Object to the form, Counsel.  
22 You're mischaracterizing his testimony because he's  
23 testified that 89 doesn't necessarily mean 89.

24 MR. J. FITZGERALD: That's fine.

25 Q. (By Mr. J. Fitzgerald) I just want to

Page 238

1 know, are you going to say it means 87, 86, or any other  
2 particular number?

3 A. I can't.

4 Q. Okay.

5 A. I'm a square shooter. You ask me a  
6 question, I answer it. If it's in my report or it's in  
7 my testimony, that's what I'm going to tell you. And I  
8 will not play games. I won't play games with my client.  
9 I won't play games with any of you because I have a  
10 reputation I uphold. And I believe it's also imperative  
11 that when I give my testimony, that I give my testimony  
12 based upon reasonable degrees of probability and within  
13 my education, training, and experience, and that's what  
14 I'm doing here. So I'm not going to tell you something  
15 that you're not going to hear at trial.

16 If I'm stating it here and we're  
17 discussing it, that's how we're going to go. If there's  
18 additional information or data that's presented at trial  
19 that's outside of these settings, I may be asked to  
20 address that, and that would be the exception. I'm not  
21 going to do that to you.

22 Q. Well, what kind of further information  
23 would you want to know that would add to any of your  
24 opinions?

25 A. Well, I don't know what we don't know.

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1 Q. I want to make sure that every opinion  
2 that you're going to give in this case is either in that  
3 report or been talked about today.

4 A. I think I just gave you that assurance.  
5 That's how I operate. If you were to hire me, I would do  
6 that same thing for you, because I don't think it's  
7 fair -- I don't think it's fair to him, and I don't think  
8 it's fair to any of you. And I take my job very  
9 seriously and my position. So I don't play that game.

10 But I do understand that during the course  
11 of trial that evidence does get presented -- we all know  
12 this because we've been there -- that evidence is  
13 presented that may not be contained in the information  
14 that I have or that any of us have discussed, that a  
15 judge will permit me to be able to discuss.

16 If that occurs, I will discuss that. But  
17 my opinions truly are limited to what we have contained  
18 within my report and what we've been discussing here  
19 today or any questions you may ask me in addition. And I  
20 will not -- I won't -- I don't play with numbers.

21 Q. Well, what further work are you planning  
22 to do besides what you just said?

23 A. I plan on reviewing the deposition  
24 testimony of the additional experts.

25 Q. What other documents are you going to look

Page 240

1 at?

2 A. I don't know because I haven't seen them  
3 yet.

4 Q. What other documents would you like to  
5 look at?

6 A. Well, if I am presented with the  
7 deposition testimony of Mr. Scott, Dr. Gillespie, any  
8 other individuals within my field of expertise, I would  
9 review that. And if there's any additional information  
10 that comes from there, I would request the ability to be  
11 able to address that. I would ask that through Mr. Kapp  
12 first. And if the judge says you can't do that, then  
13 that's the way it is. The rules of evidence are as they  
14 are.

15 Q. I just want to know, are there any other  
16 documents that you want to look at before you render your  
17 full opinions?

18 A. I believe I have rendered my full  
19 opinions. The only difference will be if there's the  
20 necessity to rebut or discuss something else.

21 Q. Beyond the deposition, are there any other  
22 documents you want to look at to put yourself in a  
23 position to render your full opinions now?

24 A. No.

25 Q. And what opinions that you render today do

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1 you not hold to a reasonable degree of probability?

2 A. None.

3 Q. Other than as stated in this record,

4 correct?

5 A. Correct.

6 MR. J. FITZGERALD: That's all I have.

7 EXAMINATION

8 BY MR. KLINE:

9 Q. Mr. Ogden, let's start with square

10 shooting. You've indicated that you have done no

11 investigation with respect to what caused the airbag

12 system not to deploy. Did I get that right?

13 A. That's correct.

14 Q. Could you have done that if they had asked

15 you to do that?

16 A. No.

17 Q. Okay.

18 A. Can I answer why?

19 Q. Yes.

20 A. It requires destructive testing on the

21 vehicle so you would have to -- it would also be -- it

22 would have to be permission from everybody here, but also

23 Chrysler, as well as the individuals who did the

24 modification. But it was outside the scope of what I was

25 requested to do.

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1 Q. And if you had gotten an order that

2 allowed destructive testing, you could have done that

3 investigation?

4 A. Yes, that's correct.

5 Q. And, instead, what you've been charged

6 with is just throwing dispersions as to why it might be

7 that that didn't go off?

8 MR. KAPP: Object to the form.

9 Q. (By Mr. Kline) Isn't that true?

10 MR. KAPP: Argumentative.

11 A. No.

12 Q. (By Mr. Kline) That's exactly what you've

13 done, isn't it?

14 A. No.

15 Q. You suggested one reason why it might not

16 have gone off, just to throw that out there, because

17 that's what you've been charged to do?

18 A. No. That is incorrect.

19 Q. Let's go to your appearance on the scene

20 on November 9.

21 Did you say what time it was that you

22 showed up on the scene?

23 A. I believe it was sometime before 8:00 in

24 the morning.

25 Q. And you were the first person on the

Page 243

1 scene?

2 A. The first persons on the scene were the

3 first responders.

4 Q. I mean on November 9. There were other

5 people there when you showed up?

6 A. No. There was just myself and

7 Mr. Martonovich.

8 Q. Okay. When you got there at some point,

9 you took what has been marked as Exhibit 292; is that

10 correct? That's that photograph?

11 A. That is correct.

12 Q. And do you remember how long after you

13 arrived at the scene that was taken?

14 A. No. But if we go into the properties of

15 photographs, it will show us.

16 Q. And at that point, do you remember whether

17 there were any police officers or anyone else on the

18 scene?

19 A. No. I was made aware that the police

20 investigation was not complete; that they had not

21 completed all of their survey, and they would complete

22 that survey. And I believe that was done through our

23 discussion with either Amanda Good or with the police

24 officer when we tried to find the locations of the

25 vehicles when we arrived at the scene.

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1 Q. And do you remember -- there's clearly one

2 piece of a tire there in that photo; is that correct?

3 A. Yes. There's a portion of a remnant.

4 Q. Okay. How many other portions or remnants

5 of the tire do you remember seeing at the scene on that

6 morning?

7 A. Just what's shown in this photograph. The

8 others had apparently been removed by Wyoming Highway

9 Patrol.

10 Q. Have you been made aware that there are

11 two pieces of the tire that other experts believe --

12 shreds of the tire or remnants of the tire that were,

13 say, comparable in size of that one that were at the

14 scene originally that evidently weren't there when you

15 were there?

16 MR. KAPP: Object to the form to the

17 extent it may misstate the evidence.

18 Go ahead.

19 A. If someone claims that there were remnants

20 of this tire at this scene after I was there, I would

21 question whether the remnants were related because I went

22 back, walked through the area, and those were the

23 remnants that were present.

24 Q. (By Mr. Kline) But you don't remember

25 seeing those other two remnants at the scene?

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1 A. I have no idea what you're talking about  
2 as far as other two remnants, so I would say they were  
3 most likely not associated.

4 **Q. And if you thought they were associated,**  
5 **you would have photographed them?**

6 A. If I would have seen them. It wouldn't  
7 have mattered whether I thought they were associated. If  
8 I would have seen them, I would have photographed them.

9 **Q. So you photographed every remnant of**  
10 **tires, regardless whether it's related to this accident,**  
11 **that was within the realm of the accident scene that was**  
12 **there when you were there?**

13 A. My photographs were intended to capture  
14 that, yes.

15 **Q. Okay. You didn't see Ms. Good or any of**  
16 **her family pick up any remnants of tires, did you?**

17 A. First of all, her family never got out of  
18 the vehicle. And Ms. Good -- the first thing we instruct  
19 people when they arrive is don't touch anything or don't  
20 move anything. So the answer would be no one moved  
21 anything while we were there.

22 **Q. So with respect to the monthly DDEC**  
23 **reading of the high speed, are there things that can make**  
24 **it underreported as far as the speed as well as**  
25 **overreported?**

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1 A. Probably not. Overreporting, yes;  
2 underreporting, no.

3 **Q. Do you have an approximation of the time**  
4 **that elapsed when the FedEx truck entered the median when**  
5 **it struck the Ednie and Gooden van?**

6 A. Yes.

7 **Q. What is that?**

8 A. Do we have our exhibits? I can use  
9 Exhibit 259. That time period is between 2.77 and 2.89  
10 seconds to strike the Chevrolet. And I didn't figure the  
11 exact distance for the impact with the Chrysler, but I  
12 have it here. So it's probably around 3 seconds to three  
13 and a quarter seconds.

14 **Q. From the time the FedEx truck entered the**  
15 **median to the time it struck the Chevrolet was 2.7**  
16 **seconds? I'm talking about specifically entering the**  
17 **median.**

18 A. 2.77 to 2.89.

19 **Q. Okay.**

20 A. That's on Exhibit 259.

21 **Q. Would the cable barrier that the truck hit**  
22 **have changed the angle of travel of the FedEx truck?**

23 A. Yes.

24 **Q. And do you have any estimate as to how**  
25 **long it would have taken the FedEx truck to travel from**

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1 **the cable barrier to the Ednie Gooden van?**

2 A. Would be less than the time frame I told  
3 you because it would be less than the time entering the  
4 median.

5 **Q. Do you still have the Garmin?**

6 A. No.

7 **Q. Finally, the second witness testified that**

8 **the maintenance -- somebody picked up the FedEx truck for**  
9 **maintenance at the North Salt Lake Transfer Station.**

10 **Do you know how they access that truck at**  
11 **the North Salt Lake Transfer Station for FedEx?**

12 A. Are you talking about Redbone?

13 **Q. Redbone or whoever you are talking about.**

14 A. I'm talking about Redbone. I don't know  
15 whether that's at the Salt Lake Transfer.

16 **Q. Do you know anyone at Redbone who has a**  
17 **pass to enter that transfer station?**

18 A. No. I'm going off of the testimony that  
19 was provided by Mr. Kehler about when they parked the  
20 vehicle and they are off duty that they will come during  
21 that time to pick up the vehicle and take it for  
22 maintenance. That's what I'm discussing. I don't know  
23 whether they're inside or outside the gate.

24 **Q. Do you know if they ever parked outside**  
25 **the gate?**

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1 A. No.

2 **Q. And you don't -- I guess you've already**  
3 **testified you don't know how far it is from Redbone to**  
4 **the North Salt Lake Transfer Station?**

5 A. I think it's right across the street, is  
6 what Mr. Kehler indicated.

7 **Q. It would be pretty hard to get it up to 89**  
8 **miles an hour between the two places, right?**

9 MR. KAPP: Object to form.

10 A. That actually wasn't my testimony, but,  
11 yes, that's correct.

12 MR. KLINE: All right. That's all I have.

13 EXAMINATION

14 BY MR. BROSSEAU:

15 **Q. Peak speeds. As I understand it, you**  
16 **are -- you've testified that there may be reasons why**  
17 **those peak speeds are not accurate?**

18 A. Correct.

19 **Q. There are reasons why they may be**  
20 **reporting a speed higher than the actual road speed was?**

21 A. Correct.

22 **Q. Is it also correct that you are not**  
23 **opining that, in fact, those peak speeds are wrong?**

24 A. Correct.

25 MR. KAPP: Object to the form.

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1 MR. BROSSEAU: What's the basis?  
 2 MR. KAPP: I object to the form.  
 3 **Q. (By Mr. Brosseau) Okay. And do you have**  
 4 **any opinion that the reported GPS speed data are wrong?**  
 5 A. Speed data --  
 6 **Q. Yes.**  
 7 A. -- I would say is not wrong. I can  
 8 explain why.  
 9 **Q. Go ahead.**  
 10 A. When you go through a Ph.D., they make you  
 11 take many classes, and one of the classes I took was  
 12 actually on geodesy and GIS. And we talk about GPS  
 13 systems and the guidance of GPS systems.  
 14 GPS speeds are actually a time distance  
 15 between different points that are on the ground. One  
 16 thing that GPS satellites are really good at are giving  
 17 you X and Y distances, just not very good at Z  
 18 delineation, meaning altitude.  
 19 You have to dwell on the spot for a long  
 20 time before it can solve that equation. However, the X  
 21 and Y which allows us to be able to determine between  
 22 each individual point that we're analyzing gives us very  
 23 accurate speeds because it's very accurate distances that  
 24 it's measuring.  
 25 So those speeds typically are accurate to

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1 within a few -- about -- I would say 500ths of a mile per  
 2 hour because the resolution is in the 10ths. So those  
 3 are fairly -- and it will either round up or round down.  
 4 **Q. But is it also correct that the longer the**  
 5 **segment, the more accurate the GPS speed data is?**  
 6 A. No. That's not how GPS speed is recorded.  
 7 GPS speed is recorded between two close points. So it  
 8 takes a random ping. Do you know what a ping is? A ping  
 9 is requesting information. It's random.  
 10 Sometimes we see it real close and  
 11 sometimes we see it far away. It's not taking an average  
 12 speed between two of those locations. We see it's taking  
 13 an average between two real close pings, but only  
 14 reporting one. So what you're getting in reality is the  
 15 average of the two points that are taken in your  
 16 northings and eastings that are provided for you. But  
 17 you're getting a true speed between those points to  
 18 within about 500ths of a mile per hour.  
 19 **Q. So the data that's reporting -- speed data**  
 20 **that's reported with GPS in this case, even one as short**  
 21 **of segments of six seconds, as far as you're concerned,**  
 22 **would be highly accurate?**  
 23 A. Yes. I think it's very accurate.  
 24 **Q. Did you make any observations regarding**  
 25 **irregularity, if any, of tread wear on the right steer**

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1 **axle tire?**  
 2 A. I did make observations. I did not see  
 3 any gross evidence of irregularity.  
 4 **Q. There have been some descriptions of**  
 5 **irregular wear by others. One person you may have saw,**  
 6 **Lew Grill, called it cupping.**  
 7 A. Yes.  
 8 **Q. Did you see anything that you considered**  
 9 **to be cupping?**  
 10 A. I see evidence where the side -- outside  
 11 sidewall of that tire as it's rotating and doing its  
 12 business after we lost our caster is wearing irregularly  
 13 on the outside during that. That's all part of this  
 14 accident. That's not due to the wheel rolling down the  
 15 road.  
 16 **Q. I didn't notice -- well, it doesn't appear**  
 17 **that you were provided with a copy of the transcript of**  
 18 **the deposition of John Smith?**  
 19 A. Yes, I was, but that occurred after my  
 20 report.  
 21 **Q. Okay. Do you have John Smith's**  
 22 **deposition?**  
 23 A. I do.  
 24 **Q. Did you read it?**  
 25 A. No. He's a tire guy. I don't care about

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1 tire guys.  
 2 **Q. And so you're not familiar with whatever**  
 3 **Mr. Smith may have said as the tire guy about tire**  
 4 **wear -- tread wear on the right steer axle?**  
 5 A. No, I'm not concerned with it.  
 6 **Q. Is it correct you didn't see anything you**  
 7 **characterize as a skid mark at this accident site from**  
 8 **the tractor or trailer?**  
 9 A. That's correct.  
 10 **Q. A skid is a term of art, correct?**  
 11 A. Generally, yes.  
 12 **Q. Certainly if you use the term "skid," it**  
 13 **would have meaning to you?**  
 14 A. Yes, it would.  
 15 **Q. And what is a skid -- skid mark?**  
 16 A. In our terms, we typically use the term  
 17 "skid mark" to mean a locked wheel, locked tire sliding  
 18 dynamically on the roadway. It's no longer static with  
 19 the roadway surface. All of your experts will know  
 20 exactly what I just said. I can explain for you.  
 21 **Q. I'm trying to figure out how something**  
 22 **would be sliding statically.**  
 23 A. It doesn't slide statically.  
 24 **Q. You said sliding dynamically rather than**  
 25 **sliding statically. I can't figure out what sliding**



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1 **statically could possibly mean.**

2 A. Yaw mark. There is a -- portions of the  
3 tire are static. Portions of the tire are rotating, and  
4 it will leave marks. So that the tire is no longer  
5 stationary with respect to the roadway, but it is still  
6 rotating. So that means that its contact patch, if it  
7 were straight, would be static, but because it's side  
8 sliding, it has become dynamic.

9 So when we look at a dynamic condition,  
10 that means typically that the wheel is locked. That's  
11 when we call it the skid. The tire surface is now  
12 dynamic or moving differential to the roadway surface.  
13 Is that a better explanation for you?

14 **Q. As I said, my problem was only talking**  
15 **about something sliding statically.**

16 A. Well, that probably was a poor choice of  
17 words. I think what I was trying to indicate is what my  
18 explanation was.

19 **Q. That's the reason I gave you a quizzical**  
20 **look. Sliding statically didn't make any sense to me.**

21 A. We've been at it a long time.

22 **Q. Okay. Have you had any discussions**  
23 **regarding this accident with either Diana Rhodes or Shawn**  
24 **Gamble?**

25 A. Those names don't ring a bell with me, so

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1 I would say no.

2 **Q. You provided us with a rate fee and**  
3 **billing document back at the time of your disclosure.**  
4 **And it does provide that there is a \$325 rate per hour**  
5 **for certain work, and \$500 per hour for testimony.**

6 **What's the reason for the distinction?**

7 A. There's two different reasons for the  
8 distinction. One is the requirement in a deposition or  
9 trial is a more stressful environment and requires more  
10 effort and drains on me. And it's typical in our field  
11 that people will charge time and a half to double time  
12 for deposition and trial. That's one part.

13 The other part is that also incorporates  
14 my read and signature. So I don't charge for that  
15 separately. And in the state of Colorado, the deposing  
16 attorney, under Colorado rules, unless you have an  
17 agreement, pays not only for the deposition contact time,  
18 they're supposed to pay for the travel, and they're also  
19 supposed to pay for the review, correct, and sign of the  
20 document.

21 Rather than break all of those things up  
22 and have that as a bill that I provide to that deposing  
23 attorney later, I incorporate it into one, and that  
24 includes my travel as well.

25 MR. BROSSEAU: I pass the witness.

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1 MR. KAPP: I do have some questions.

2 EXAMINATION

3 BY MR. KAPP:

4 **Q. This is just an order of business. I**  
5 **can't imagine these gentleman would do something like**  
6 **that. But is there anything in your file that you have**  
7 **generated and that are part and parcel of your opinions**  
8 **that they have not made an exhibit of, because if there**  
9 **is, then I want you to make an exhibit of it so that**  
10 **these guys have got everything you've generated with the**  
11 **deposition.**

12 A. Well, Section F was not made specifically  
13 in its total an exhibit, but portions of Section F of my  
14 first notebook are in. That's actually ECM download,  
15 airbag control module, sensory and diagnostic ROL modules  
16 downloads, our inspection forms that were all part of  
17 what we provided.

18 MR. KAPP: What's the next exhibit number?

19 MR. BROSSEAU: 299.

20 MR. KAPP: Exhibit 299, and I don't care  
21 how we get it done at the end of the day.

22 MR. BROSSEAU: Do you want to mark the  
23 entire binder 299?

24 MR. KAPP: That works for me. We'll mark  
25 the entire binder 299.

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1 THE DEPONENT: Okay. As long as I can  
2 maintain -- or we make copies here. That's fine.

3 MR. BROSSEAU: Let's deal with that off  
4 the record when we finish.

5 (Exhibit 299 marked.)

6 A. I think we covered everything that was in  
7 this blue folder. But there's other materials I see that  
8 are in here. So I think if we put all of the items I had  
9 into that blue folder and made this, this most likely  
10 would be duplicative, but at least we'll know for sure we  
11 have all that.

12 **Q. (By Mr. Kapp) Is there anything else to**  
13 **your file that they have not made an exhibit of that you**  
14 **have generated?**

15 A. Yes. Our HDS scan, our high definition  
16 scan, using the FARO X330 which I have that thumb drive  
17 in here was not made an exhibit. I'm not quite sure how  
18 to handle that. We could mark it as an exhibit, but  
19 that's one we have as well.

20 **Q. Why don't we do that.**

21 MR. BROSSEAU: While he's pulling that  
22 out, we also did not mark as an exhibit the large  
23 majority of his photos or his video of the demount  
24 process. And we did not mark his decel calculations.  
25 That's a separate document. We did not mark his GPS

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1 overlay analysis, all of which in this latter category  
2 were on the flash drive produced to us in December of  
3 2015.

4 MR. KAPP: So long as all counsel agree  
5 that they received all those documents.

6 MR. BROSSEAU: I don't know if they did or  
7 not. I know that in our case, we made a specific request  
8 to you in December. And in response to that, you sent a  
9 letter to us containing that flash drive. It was not  
10 cc'd to anybody else, so I don't know if it was provided  
11 to anybody else other than us who asked for it.

12 MR. KLINE: I don't know that we have it.  
13 I don't know.

14 MR. M. FITZGERALD: We only have the  
15 photos.

16 MR. KAPP: Well, then I guess somehow,  
17 somehow, in the world of electronics, we'll have to  
18 duplicate those and make them all a part of the  
19 deposition.

20 THE DEPONENT: Okay. If you can remind me  
21 of that, that would be great because I'll forget it.

22 MR. BROSSEAU: So if you want to go ahead  
23 and do something, we can make an exhibit a 300 as a place  
24 marker, place saver, and then you can provide materials  
25 Mr. Kapp has requested to Mr. Kapp, and he can distribute

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1 them to all counsel as the Exhibit 300.

2 MR. KAPP: And all I'm doing, guys, is I  
3 just don't want anybody in July standing up and going,  
4 I've never seen that before and you never gave it to me.  
5 I'm giving everybody full opportunity to have the things  
6 he's generated. And if you comfortable with not marking  
7 these as exhibits, we won't. But if we need to, we  
8 will.

9 MR. BROSSEAU: Paul, I marked what I felt  
10 I needed to. So it's up to you or other counsel if you  
11 want other things marked.

12 MR. KAPP: We'll mark --

13 MR. BROSSEAU: If you start down the path  
14 and you want to mark everything, then what I suggest is a  
15 placeholder 300 of Dr. Ogden to supply to you whatever  
16 hasn't been marked here is probably the best way to go,  
17 in my humble opinion.

18 MR. KAPP: I like that idea. And unless  
19 there is objection, that's what we're going to do.

20 Is there any objection?

21 MR. KLINE: To be honest with you, Jim had  
22 diverted my attention when Mark made his suggestion,  
23 so --

24 MR. BROSSEAU: So let me state it for the  
25 record and see if this works for you guys. And that is,

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1 we're going to have the reporter mark as Exhibit 300,  
2 mark a blank piece of paper. It will be a placeholder.  
3 That placeholder will be part of this record until such  
4 time as -- or Dr. Ogden supplies to Mr. Kapp all of the  
5 remaining file materials which Dr. Ogden and Mr. Kapp  
6 believe have not been marked in this deposition thus far.

7 Mr. Kapp will then provide those as the  
8 new Exhibit 300 to this deposition.

9 MR. KLINE: That works for me.

10 MR. J. FITZGERALD: That's fine.

11 MR. KAPP: Okay.

12 (Exhibit 300 marked.)

13 **Q. (By Mr. Kapp) Counsel has asked you**  
14 **several questions about this right front tire.**

15 **Did you ever do any analysis of the right**  
16 **front tire size, anything like that?**

17 A. Yes.

18 **Q. What did you do?**

19 A. Well, I looked at the aspect ratio and the  
20 tread width size and compared that to what the door panel  
21 says is the appropriate size or what is the suggested  
22 size, if you will, of this vehicle, and looked at the  
23 height difference between those two tires, the one the  
24 size suggested from the door panel by the manufacturer as  
25 well as the size that was actually put on the steer axle.

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1 **Q. Okay. Was there a difference in size?**

2 A. Slightly, yes.

3 **Q. What is slightly?**

4 A. Three millimeters in height.

5 **Q. In terms of -- there's been testimony in**  
6 **this case that the tire on the right side was the wrong**  
7 **tire --**

8 MR. KLINE: Object to the form of the  
9 question already.

10 MR. BROSSEAU: It's only going to get  
11 worse from here.

12 MR. KAPP: All right. Let's quit  
13 laughing.

14 **Q. (By Mr. Kapp) There's been testimony that**  
15 **the tire on the right side was incorrect in some respect.**

16 **My question to you is, do you have an**  
17 **opinion as to whether or not the tire that was on the**  
18 **right-hand side had any effect on the handling of the**  
19 **truck?**

20 MR. BROSSEAU: Objection, form and  
21 foundation.

22 MR. KLINE: Join.

23 MR. J. FITZGERALD: Join.

24 A. It wouldn't. I mean, I have an opinion it  
25 wouldn't. It's not a very big difference, so --

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1 **Q. (By Mr. Kapp) Okay. This morning, Mark**  
 2 **was referring to it as the first mark on the road.**  
 3 A. Yes.  
 4 **Q. The first -- the highway patrol had**  
 5 **painted the first mark on the road by the time that you**  
 6 **got there?**  
 7 A. That's correct.  
 8 **Q. Do you know when they painted it?**  
 9 A. I believe it's visible in their scene  
 10 photographs the afternoon of the impact, so it would be  
 11 right after the impact sometime.  
 12 **Q. Okay. This discussion about the airbag on**  
 13 **the Dodge Chrysler van, who owns that?**  
 14 A. That was owned by the plaintiffs in this  
 15 case.  
 16 **Q. Do you know whether Plaintiff's counsel**  
 17 **have asked their experts to analyze why the airbag did**  
 18 **not deploy?**  
 19 MR. KLINE: For the record, Plaintiff  
 20 Ednie family claimants do not derive their claim from  
 21 somebody who owned that vehicle.  
 22 MR. KAPP: Okay.  
 23 MR. KLINE: In other words, it wasn't  
 24 titled to us.  
 25 **Q. (By Mr. Kapp) Who was it titled in, if**

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1 **you know?**  
 2 A. I have no idea. I have -- it's not my  
 3 vehicle. I have no possession. I have no authority.  
 4 **Q. Do you know if the attorneys that**  
 5 **represented the interest that owned the van ever asked**  
 6 **any of their experts to determine why the airbag did not**  
 7 **deploy?**  
 8 A. Since I have not been informed of an  
 9 inspection, which should be a group inspection by every  
 10 one of the engineers involved, to include Chrysler as  
 11 well as those that did the modifications, I have never  
 12 been informed of ever such inspection or intent to do an  
 13 inspection to test it.  
 14 **Q. Okay. But let me make sure I understand.**  
 15 **From your analysis, you have concluded that there was a**  
 16 **command to deploy the airbag?**  
 17 A. That's correct.  
 18 **Q. When the command was sent, what happened?**  
 19 A. Nothing.  
 20 **Q. You just don't know why the command didn't**  
 21 **deploy the airbag; is that what you're saying?**  
 22 A. That's correct.  
 23 **Q. Okay.**  
 24 A. Let's just pretend that counsel don't  
 25 agree with your opinion that the shaft broke while the

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1 truck was still westbound. Is there any other  
 2 corroborating field evidence that you can look to to  
 3 support your conclusion?  
 4 MR. BROSSEAU: Object to form.  
 5 MR. KLINE: And I object to the form  
 6 because the truck had some westbound component the whole  
 7 time, didn't it?  
 8 MR. KAPP: Let's try it this way.  
 9 **Q. (By Mr. Brosseau) Let's pretend that**  
 10 **counsel didn't agree that the steering shaft broke while**  
 11 **the truck was westbound in the westbound lane of I-80.**  
 12 **Is there any corroborating evidence that**  
 13 **you can look to to support your opinion that it did?**  
 14 A. Yes.  
 15 **Q. What is it?**  
 16 A. That's the roadway evidence.  
 17 **Q. What about the roadway evidence**  
 18 **corroborates your opinion?**  
 19 A. The loss of caster in those wheels going  
 20 back and forth and oscillating back and forth is  
 21 indicating there is no steering control. It means those  
 22 front wheels are not connected. And if a driver has his  
 23 hands on the steering wheel and there's still integrity,  
 24 he will feel that as a vibration that he can damp out by  
 25 power steering and actually move the vehicle over.

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1 And so then we wouldn't see the  
 2 oscillation. But the oscillation is telling us that  
 3 there is no steering control.  
 4 **Q. Is there any significance to the fact that**  
 5 **the truck left the westbound lane in 110 -- was it 110**  
 6 **feet?**  
 7 A. 189, I believe. Want me to check that to  
 8 be certain? Yeah, it's 188.5, so approximately 189 feet.  
 9 **Q. Is there any significant -- is that**  
 10 **corroboration in any manner or in any fashion significant**  
 11 **to you?**  
 12 A. Yes.  
 13 **Q. How?**  
 14 A. That's a pretty quick hard steer to the  
 15 left directing that vehicle off the roadway. It wouldn't  
 16 be the same as a simple lane change. But in excess of  
 17 that, it's occurring between Lines A and B that we had  
 18 addressed previously which are probably no more than 10  
 19 to 15 feet apart, and so it's happening quite quickly.  
 20 MR. KAPP: That's all I've got for now. I  
 21 suspect that I will have other questions of the witness  
 22 in July.  
 23 MR. BROSSEAU: I have nothing further.  
 24 (Discussion off the record.)  
 25 MR. BROSSEAU: The record should reflect

1 that with the agreement of all counsel, the deponent is  
 2 withdrawing Exhibit 299, will arrange to get copies made,  
 3 and will then provide copies, including one that will be  
 4 furnished to the reporter so it will be with the record  
 5 as the original 299.

6 MR. KAPP: Yes. Just so long as I don't  
 7 personally have to do anything to make that happen.

8 MR. BROSSEAU: Is that okay with  
 9 Plaintiff's counsel?

10 MR. KLINE: Yes.

11 \* \* \* \* \*

12 (WHEREUPON, the foregoing deposition was  
 13 concluded at the hour of 5:06 p.m. on March 11, 2016.)  
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 25

1 REPORTER'S CERTIFICATE

2  
 3 I, Claudia R. Booton, a Registered  
 4 Professional Reporter and Notary Public within and for  
 5 the State of Colorado, commissioned to administer oaths,  
 6 do hereby certify that previous to the commencement of  
 7 the examination, the witness was duly sworn by me to  
 8 testify the truth in relation to matters in controversy  
 9 between the said parties; that the said deposition was  
 10 taken in stenotype by me at the time and place aforesaid  
 11 and was thereafter reduced to typewritten form by me; and  
 12 that the foregoing is a true and correct transcript of my  
 13 stenotype notes thereof.

14 That I am not an attorney nor counsel nor in  
 15 any way connected with any attorney or counsel for any of  
 16 the parties to said action nor otherwise interested in  
 17 the outcome of this action.

18 My commission expires: November 22, 2016.  
 19  
 20  
 21

22 Claudia R. Booton

23 Registered Professional Reporter  
 24 notary Public, State of Colorado  
 25

1 I, JERRY S. OGDEN, Ph.D., P.E., the  
 2 deponent in the above deposition, do acknowledge that I  
 3 have read the foregoing transcript of my testimony, and  
 4 state under oath that it, together with any attached  
 5 Statement of Change pages, constitutes my sworn  
 6 statement.  
 7  
 8

9 \_\_\_\_\_ I have made changes to my deposition

10 \_\_\_\_\_ I have NOT made any changes to my deposition  
 11  
 12

13 \_\_\_\_\_  
 14 JERRY S. OGDEN, Ph.D., P.E.  
 15

16 Subscribed and sworn to before me this \_\_\_\_\_ day  
 17 of \_\_\_\_\_.

18  
 19 My commission expires: \_\_\_\_\_  
 20  
 21

22 \_\_\_\_\_  
 23 Notary Public  
 24  
 25